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AUTHOR Bergeson, John B.
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ABSTRACT

This manual is designed to assist students in a course on media in instruction and management. Units are included on: (1) still picture projection; (2) audio media; (3) motion picture projection; (4) print media, duplication, and displays; (5) selection of appropriate instructional materials; and (6) selecting appropriate media. Each unit includes an introduction, pre- and post-tests, behavioral objectives, an instructional monograph, and instructional activities. (EMH)

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MANUAL

SECONDARY EDUCATION 420 (2 hrs.)

and

SECONDARY EDUCATION 508 (1 hr.)

MEDIA IN INSTRUCTION AND MANAGEMENT

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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CENTRAL MICHIGAN UNIVERSITY

IR003 831

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The original course and the May, 1973 revision of Secondary Education 420: Educational Media, was undertaken and carried out conjointly through the efforts of:

John B. Bergeson, Director of Instructional Materials Center, Central Michigan University

Sherwood E. Bridges, Director of the Division of Instructional Resources, Central Michigan University

Phillip W. Bugg, Consultant and Programmer for Instructional Development, Central Michigan University

William W. Harper, Consultant and Programmer for Instructional Development, Central Michigan University

Robert Olson, Professor of Secondary Education, Central Michigan University

The revision (January, 1976) was done by John B. Bergeson, Director of Instructional Materials Center and Professor of Secondary Education.

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USE OF MANUAL

The Manual for Secondary Education 420(2) and 508(1): Media in Instruction and Management is provided especially for student use. It is a collection of information pertaining to the course including such things as a description of instructional strategies, course content, glossary of terms, study suggestions for each module, objectives for each module, pre and post tests, and instructional monographs.

Since the student may wish to insert notes or for convenience remove sheets, a looseleaf format has been used that makes the Manual easily adaptable for use in a three-ring binder. It is hoped that students will find the Manual useful both as a source of information and as a means for organizing their coursework and study materials. The author is particularly eager to make the Manual useful and a valuable adjunct to the course toward insuring the student's success in developing competencies in educational media. I would appreciate your comments regarding the use and usefulness of the Manual. Please submit your comments in writing--signed or unsigned--to myself or to your IPCD contact.

Best wishes for success in this course!

COURSE RATIONALE AND JUSTIFICATION

One of the truisms for media in education and management is that presentations are made more effective and efficient through the proper presentation of appropriate instructional materials. But many, many controversies have waged, loud and long over what learning really is, what is meant by "effective" and "efficient", and by what constitutes "proper presentation of appropriate" instructional materials.

As advances in technology have permitted, new ways of structuring and displaying presentation materials have been introduced and have grown in popularity--not the least among these being motion picture films, slides, audio tapes, television, and so on. And within recent years audio-visual aids, devices, teaching machines, programmed instruction, and other "aids" have been received by schools, recipients of instruction, businesses and governmental institutions and have created fluries of controversy among teachers and administrators.

At times there has been open warfare between the supporters and the detractors of media (as it has come to be known), as used in instruction. The detractors have flatly refused to believe in the worth of such innovative "fads" and "gimmicks". The supporters have adamantly gone ahead making use of whatever came into their hands. Unfortunately, but truthfully, much of the media that has been used has been used indiscriminately: the media were used without regard for appropriateness to the instructional objectives, without regard for the participants' needs and preferences, and without regard for the learning experiences, actually required to insure conceptual learning, generalizations, and transfer to job situations.

Happily the real issues in this controversy are becoming clearer, and like most controversies, truth favors neither the adamant supporters nor the detractors. The detractors are beginning to concede "some" uses for instructional media, and the supporters are no longer regarding media as a panacea. Both sides are beginning to recognize that media must be used discriminately--that specific instructional problems require specific media solutions.

The new issue in instructional technology is not whether media should be used, but which, when and under what conditions should media be used. It is around this issue that the course: Media For Instruction and Management has been structured to help the participants develop competencies in knowing the specific characteristics of various media systems and how these systems are appropriate to specific instructional problems.

The problems of instruction, which can be solved by the use of instructional media require that the presenter have the theoretical knowledge to adequately perceive the problems and make decisions about solutions, and the practical knowledge and actual operation skills to select and use the various media systems. Therefore, an attempt has been made to design the course with a balance between theoretical teachings and practical "hands-on" experience.

GENERAL COURSE DESCRIPTION

Secondary Education 420(2) and 508(1): Media in Instruction and Management is a three credit hour course designed to teach and develop instructor competencies in the use of mediated instructional presentations, and related techniques.

Focus of Course

The course content and methods focus upon basic and current audio-visual instructional methodologies, devices, and materials. The general emphasis will be to develop competent selection and utilization capabilities.

Goals

The goals of the course include the following:

1. To develop a sense of the value of technology in instructional presentations
2. To develop understanding about the role of media in instruction
3. To develop competencies in selecting and evaluating instructional materials
4. To develop competencies in designing and producing auditory and visual instructional materials
5. To develop competencies in operating and utilizing visual and auditory presentation systems
6. To develop competencies in the selection and use of behavioral objectives as they relate to a systematized approach to instructional presentations.

Source and Use of Behavioral Objectives

Each of the general goals above has been task analyzed, and from this analysis a number of specific goals have been identified. Each of these goals has been operationally defined as a behavioral objective and is in essence a statement indicating (1) what overt behavior of the student will be acceptable, and (2) what conditions will exist prior to the behaviors.

Complete lists of behavioral objectives for each module are contained in this manual. These behavioral objectives are provided to communicate directly (and prior to instruction and testing) the kinds of behaviors which are considered appropriate to the course. Students are expected to read, comprehend, and apply the behavioral objectives as a part of their instruction.

In all cases, the behavioral objectives will tell the student what response is going to be required in tests and in demonstrating proficiency in equipment operation. Actual test items and equipment operation tasks will be derived only from the behavioral objectives.

Requirements

The general course requirement is simply that the student satisfactorily demonstrates specific competencies by:

1. Showing that he or she can operate equipment. The learner can either come to the IMC in Ronan Hall on CMU's campus (See map of CMU's campus on pg. 9 and a floor plan of the IMC on pg. 10), to arrange for a check-out session or someone can be selected in the learner's location to conduct the checkout (the former is encouraged).
2. Selecting materials for his or her area of responsibility (simulation exercise)
3. Producing a transparency
4. Passing an examination of the multiple-choice type which are derived from the behavioral objectives for each module. This can be done on campus or arrangements to give the test can be done in the learner's location (the former preferred).
5. Producing an instructional presentation or unit that would accomplish the objectives the learner has determined as important

NOTE: The student will send or bring all produced materials to the instructor and will let the instructor know when he or she is ready to take the examination and check-out on equipment operation.

The course is divided into 6 modules and each of the modules has specific instructions on how to proceed. It is imperative that you read the instructions for each module before you begin its study. You do not have to follow the instructions but it is the best way we know of to help you master the course requirements. You do have to take the multiple-choice test, hand in the transparency, simulation exercise, and instructional unit, and demonstrate your proficiency in operating equipment.

Grading

Grades are computed on the basis of 200 points as follows:

96-100% of 300 points (288-300)=A	85-86% of 300 points (255-257)=B-
92-95% of 300 points (276-287)=A-	83-84% of 300 points (249-254)=C+
90-91% of 300 points (270-275)=B+	81-82% of 300 points (243-248)=C
86-89% of 300 points (258-269)=B	79-80% of 300 points (237-242)=C-
	Below 79% of 300 points (Below 237)=E

Of the 300 total points above, 100 are derived from equipment operation, and handling in the simulation exercise and the transparency. All these activities are graded pass-fail. Another 100 points come from your performance on the examinations. The last 100 points is derived from your performance on the instructional presentation or unit (see Module #6 for the objectives and grading form for this undertaking).

Facilities for Instruction

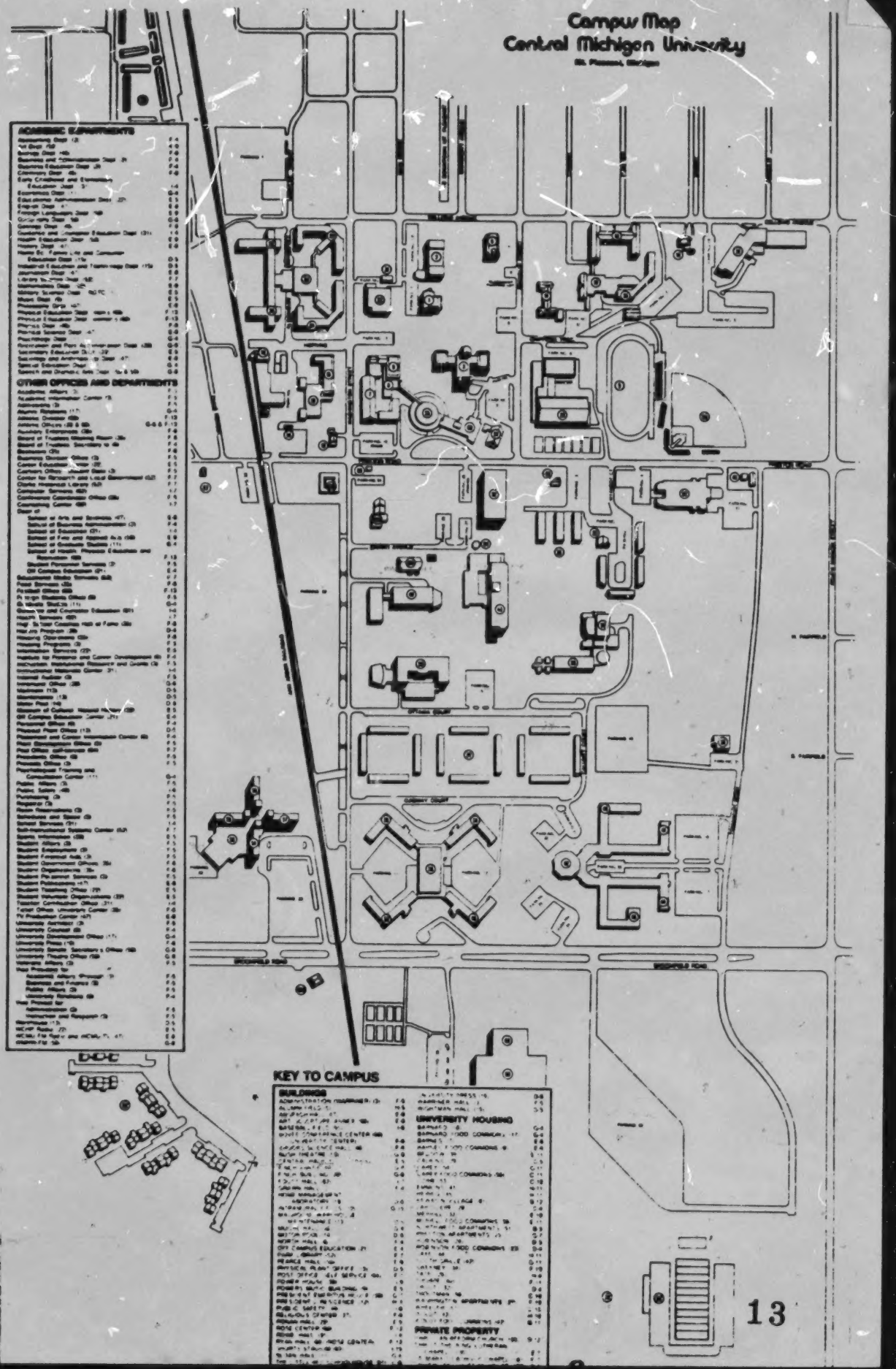
For learning how to operate equipment and preparing the transparency, the learner has at least two options. The first option is the most desirable because of ready availability of equipment, but requires the learner to come to campus for a day or two--depending on how much of the equipment the learner wants to learn here. Note in each of the modules that require equipment operation we indicate the "accession" number under "Type of Instruction" (see page 11 for example). This is the 7 digit number that you see directly across from the description of each machine. If the learner does come to campus, he merely has to go to the Park Library--see map of campus which follows on pg. 9--and find the Self Instructional Systems Center (SISC) which is located on the northwest corner of the first floor, and ask for the training package wanted by its accession number. The Self Instructional Systems Center is open weekends and nights (except Friday and Saturday nights) during the school year and in summer session. The learner will then be directed by the clerk to a study carrel which is specially set up to teach the learner to operate the particular piece of equipment or produce the transparency.

The other option that is available is to have the self-instruction that is usually found in the Self Instructional Systems Center sent to the learner. In this case, the designer of the course has modified the instruction to the extent that it is in filmstrip, filmstrip with audio cassette, or printed form (called "packets" in each of the modules). This material is then sent to the learner along with a cassette player and a filmstrip viewer. The major problem with using this self instruction in the learner's home area is that he or she will have to locate the particular kind of equipment that the course specifies the student to learn to operate. Since the designer has attempted to select that equipment which is the most prevalent in schools and business, this may be no problem. Obviously, the best place to go first to see if equipment is available is the local school district or county (intermediate) school district. A telephone call to the superintendent or assistant superintendent for instruction will generally locate the person in the school district who is responsible for its equipment.

The types of equipment and activities that you will be tested on when you come to campus for your check-out session are as follows (in other words, if the learner elects not to come to campus for training, this is the equipment he will need to locate):

1. Standard 500 Filmstrip Projector
2. Kodak 850 Carousel Slide Projector
3. Overhead Projector (no specific brand name--they are all very similar)
4. Opaque Projector (no specific brand name--they are all very similar)
5. Transparency Preparation (a Thermofax copy machine is needed)
6. Wollensak 1500 Series Reel-to-Reel Audio Tape Recorder
7. Sony 104A Reel-to-Reel Audio Tape Recorder
8. Wollensak 2520 Audio Cassette Recorder (or equivalent)
9. Kodak Pageant 16mm Film Projector
10. Bell & Howell 552 Auto-load 16mm Film Projector
11. Sony AV 3600 Video Tape Deck, Camera (with zoom lens), and Monitor
12. Standard Rocket Spirit Duplicator (or equivalent)

NOTE: It is very possible that the learner would have access to some or most of the equipment in his home area and would elect to come to campus for instruction in those areas in which equipment is not available--thereby shortening his or her stay.


Campus Map
Central Michigan University
ACADEMIC DEPARTMENTS
OTHER OFFICES AND DEPARTMENTS
KEY TO CAMPUS
BUILDINGS
UNIVERSITY HOUSING
PRIVATE PROPERTY

FLOOR PLAN TO IMC

RONAN HALL

MODULE #1--STILL PICTURE PROJECTION

Introduction

The importance and the value of still picture projection devices requires no elaboration. We have long recognized that human beings are predominately "visual" animals, and that learning for most individuals is accomplished through the visual senses.

This instructional module is designed to give you basic knowledge--advantages and disadvantages--of the four major still projection systems: overhead projector, opaque projector, filmstrip projector, and slide projector. It is further designed to help you obtain at least minimal skill in operating each of these machines in acquiring or producing projection materials.

Recommended Procedure You Should Follow

1. Note the Areas below and where various aspects of them are located in this MODULE:

Areas	Behavioral Objectives	Type of Instruction	How Tested
A. Still Picture Projection	p. 19	Monograph (p. 23)	Test
B. Still Picture Projector Operation:			
1. Standard 500 filmstrip projector	p. 53	Audio-slide (SISC) 301-0179 or Packet #1	Check-out
2. Kodak 850 Carousel slide projector	p. 57	Audio-slide (SISC) 503T-0259 or Packet #2	Check-out
3. Overhead Projector	p. 63	Flip-chart (SISC) 343T-0146 or Packet #3	Check-out
4. Opaque Projector	p. 67	Flip-chart (SISC) 343T-0145 or Packet #4	Check-out
C. Transparency Preparation	p. 71	Audio-slide (SISC) 301-0178 or Packet #5	Trans-parency sent to instructor to be graded pass or fail

2. Take the Pre-test for Area 1 which begins on p. 15 to determine what you already know about this part of the MODULE. Use the key following the test (p. 18) to see how you fared. Note that the answer key also gives the behavioral objective number.

3. If the Pre-test reveals that you need additional study in Area 1, study the Behavioral Objectives for this area which begin on p. 19 and work through the instruction that is offered (Monograph which begins on p. 23. Note that space has been provided after each behavioral objective so that you can take notes while studying the instruction.

4. To see how well you are prepared in Area 1 after instruction, take the Post-Test which begins on p. 45. Note the objective numbers which follow the correct answer on the answer key following the Post-test. They will refer you directly to objectives with which you still may be having trouble.

5. Look at the Pre-tests for Area 2 which begins on p. 49 and include operating the Standard 500 Filmstrip Projector, the Kodak 850 Carousel Slide Projector, the 3M Overhead Projector, and an Opaque projector. Can you do these things? If so, fine, you can successfully check-out. If you can't do some or all of them, study the Behavioral Objectives for Area 2 which begin on p. 53 and work through the instructional packets that are available (#1 through #5) or come to the Self Instructional Systems Center and work through sets #301-0179, 503T-0259, 343T-0146, 343T-0145. After this instruction, you should have no trouble checking out on the equipment included in Area 2.

6. There is no Pre-Test for the transparency preparation (Area 3). This is because you have to prepare a transparency and send it to the instructor. The behavioral objectives for this Area are found on p. 71. Use Instructional packet #5 for instruction or come to the Self Instructional Systems Center and work through set #301-0178.

Selected Readings

	Pages
Kemp, Jerrold E., Planning and Producing Audiovisual Materials, 2nd Edition, Chandler, 1968.	65-90 142-159 161-186
Wittich, Walter Arno and Charles Francis Schuller, Instructional Technology: Its Nature and Use, 5th Edition, Harper and Row, 1973.	391-446

	Pages
Gerlach, Vernon S. and Donald P. Ely, A Systematic Approach, Prentice-Hall, 1971.	332-339 354-360
Dale, Edgar, Audiovisual Methods in Teaching, 3rd Edition, Dryden Press, 1969.	429-473
Brown, James W., Richard B. Lewis and Fred F. Harcleroad, AV Instruction: Media and Methods, 4th Edition, McGraw-Hill, 1973.	115-206 479-484
Minor, Ed and Harvey R. Frye, Techniques for Producing Visual Instructional Media, McGraw-Hill, 1970.	163-228

Pre-Test for Area 1

Directions: Circle the letter of the correct answer below.

1. Which of the following is a characteristic of filmstrip projection?

   A. filmstrips are only available in black and white
   B. some filmstrip projectors offer remote control
   C. filmstrip projector bulbs have a very short life
   D. filmstrips are generally short (less than 25 frames)

2. One of the principle disadvantages of filmstrip projection is that:

   A. filmstrips are hard to store and retrieve
   B. filmstrips are appropriate for individuals, small groups and large groups
   C. filmstrips are difficult without specialized equipment
   D. filmstrips readily adapt for use with audio media

3. Which of the following is a characteristic of slide projection?

   A. slides are available in four sizes
   B. slides are available only in color
   C. slide projectors cannot be adapted to show filmstrips
   D. slide projectors cannot be tray loaded

4. One principle disadvantage of slide projection is that:

   A. slides can be shown at any pace
   B. slides are available from commercial publishers
   C. slides are easily produced by amateurs
   D. slides do not show motion

5. Which one of the following is an Effective Utilization Rule for filmstrip or slide projection?

   A. follow up presentation with student involvement
   B. show a slide or filmstrip frequently to keep students interest high
   C. select slides or filmstrips for entertainment value
   D. select slides or filmstrips which use cartoons

6. Which of the following is not a characteristic of overhead projection?

   A. can be used as an electric chalkboard
   B. used at rear of classroom
   C. can project transparent materials up to 10" x 10"
   D. available with acetate roll

7. Which of the following is <u>not</u> an advantage of overhead projection?

   A. requires very little maintenance
   B. projectuals can be prepared easily
   C. projectuals are available commercially
   D. most projected materials are limited to line drawings

8. Which of the following is not one of the types of projectuals that can be used with the overhead projector?

   A. claycoat lifts
   B. opaque copies
   C. diazo process transparencies
   D. technamation transparencies

9. Which of the following is not a presentation technique appropriate to the overhead projector?

   A. 2-dimensional objects in silhouette
   B. built-in arrow pointer
   C. 3-dimensional objects with mirror
   D. overlays

10. Which of the following is a characteristic of opaque projection?

    A. projects transparent materials up to 10" x 10"
    B. can be used as an electric chalkboard
    C. printed materials require no special preparation
    D. can be used in a lighted room

11. Which of the following is true of opaque projection?

    A. projectors are comparatively difficult to operate
    B. light "seepage" can be annoying to audience
    C. projector can be used for making enlarged tracings
    D. A and B above
    E. B and C above

12. In comparison with other projected software

    A. overhead transparencies can be easily prepared
    B. overhead transparencies are difficult to prepare
    C. overhead transparencies are neither easier or more difficult than other types of projectuals

13. You are conducting a business seminar and you want to visit some offices around your town to take pictures of various office workers doing their jobs. Motion is important but not vital. You want your visuals to be in color, to be brought up to date often, and to be used individually by participants. You also want to keep expenses down. Which medium below should you choose?

A. overhead
B. opaque
C. slides
D. filmstrips

14. A member of your audience has an illustration from a magazine that she wants to trace but she has two problems--she wants to save the magazine and she would like to make it 4 times as large. Which type of media below would you recommend that she use?

A. filmstrip projection
B. overhead projection
C. slide projector
D. opaque projection

15. You are conducting a sales training class and you have been given limited funds to purchase some visual media. You are planning to individualize your course and you want to get as many visual images (pictures) as possible for your money. You do not plan to edit what you buy. Which type of media below should you buy?

A. transparencies
B. opaque pictures
C. slides
D. filmstrips

16. You are teaching English and you want to project a story that one of your students wrote so that the whole class can see it. You cannot darken your room much. Which still picture projection device below would you choose?

A. overhead
B. opaque
C. filmstrip
D. slide

Pre-Test Key

Question Number	Correct Response	Module Number	Area Number	Behavioral Objective#
1	B	2	1	3
2	C	2	1	4
3	A	2	1	1
4	D	2	1	2
5	A	2	1	5
6	B	2	1	6
7	D	2	1	7
8	B	2	1	8
9	B	2	1	9
10	C	2	1	10
11	E	2	1	11
12	A	2	1	6
13	C	2	1	12
14	D	2	1	12
15	D	2	1	12
16	A	2	1	12

To consider yourself competent in this area, you should not have made more than one error.

Area 1--Still Picture Projection--Behavioral Objectives

1. The student will be able to identify statements which describe characteristics of slide projection and/or projectors.

   A.
   B.
   C.
   D.
   E.
   F.
   G.
   H.

2. The student will be able to identify statements which describe seven advantages and at least one disadvantage of slide projection.

   A.
   B.
   C.
   D.
   E.
   F.
   G.
   H.

3. The student will be able to identify statements which describe eight characteristics of filmstrip projection and/or projectors.

   A.
   B.
   C.
   D.
   E.
   F.
   G.
   H.

4. The student will be able to identify statements which describe six advantages and at least one disadvantage of filmstrip projection.

   A.
   B.
   C.
   D.
   E.
   F.
   G.

5. The student will be able to identify statements which describe the four basic utilization rules for filmstrip and slide presentation (and all other media too).

   A.
   B.
   C.
   D.

6. The student will be able to identify statements which describe four characteristics of overhead projection and/or overhead projectors.

   A.
   B.
   C.
   D.

7. The student will be able to identify statements which describe seven advantages and four disadvantages of overhead projection.

   A.
   B.
   C.
   D.
   E.
   F.
   G.
   H.
   I.
   J.
   K.

8. The student will be able to identify statements which describe six kinds of projectuals that can be used with the overhead.

   A.
   B.
   C.
   D.
   E.
   F.

9. The student will be able to identify statements which describe four special presentation techniques that can be used with the overhead.

   A.
   B.
   C.
   D.

10. The student will be able to identify statements which describe the two main characteristics of opaque projection.

A.
B.

11. The student will be able to identify statements which describe five advantages and seven disadvantages of opaque projection.

A.
B.
C.
D.
E.
F.
G.
H.
I.
J.
K.
L.

12. Given various hypothetical learning situations, the student will be able to select the appropriate still picture projection device to match the situation (considering the characteristics, advantages, and disadvantages of the four basic kinds of still picture projection).

Area 1--Still Picture Projection--Monograph

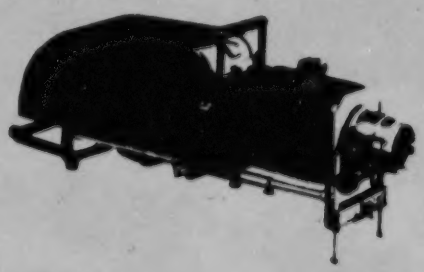
The projected image has held much fascination for trainers and educators. Particularly since World War II, projected materials have come to be used extensively in industry and education. In more recent years, the projected image has become increasingly important as it has been discovered that certain forms of individualized instruction are greatly enhanced through the use of slides, filmstrips, and other types of pictures. Still picture projection provides the presenter with much flexibility in arranging various activities, and this medium is suitable for use with groups of all sizes as well as individualized study.

For our purpose, we are going to consider four types of still picture projection: 2" x 2" slides, filmstrips, overhead projectuals, and opaque materials. With one exception, the projection of still images is accomplished by passing light through film or some other type of transparent material and then transmitting this image onto a screen. The principal exception to this is opaque projection. In opaque projection, a strong light is directed onto a page of a book, or a magazine, or a sheet of paper and reflected onto a screen. With this very brief introduction, let us consider separately the four kinds of still picture projection.

Slide Projection

The first slides to achieve wide use were called lantern slides. These were 3 1/4" x 4" glass mounted slides that were imprinted with a photographic or hand printed image. Prior to World War II most educational institutions had whole series of slides of this type. Even now they may be used occasionally in such fields as medicine, science, and art--where an extra large image might be required. However, special projectors are required, and most institutions no longer have this type of projector. With the

a 3 1/4" x 4" Lantern Slide Projector.



comparatively recent development of the 35mm camera and its wide and universal acceptance, slide projection is now almost standardized with the familiar 2" x 2" cardboard (or plastic) carrier framing the film.

The most common 2" x 2" slides are "shot" with a 35mm camera using color film. An important advantage of the 2" x 2" slides is that excellent color quality is achieved for a relatively low cost.

The following are eight characteristics of slides and slide projectors:

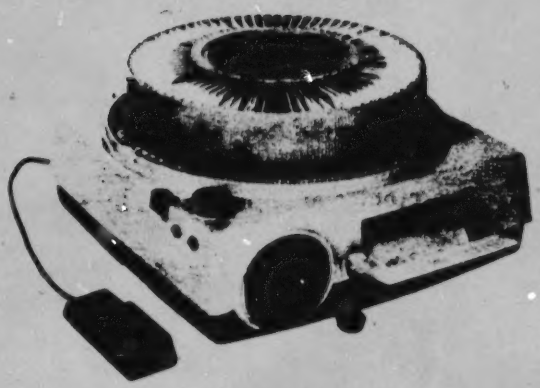
1. Slides are available in three 2" x 2" slide holders. The so-called double frame, 2" x 2" slide is the most common. Thirty-five mm cameras are available which take a single frame picture, one-half the size of double frame slides, giving twice as many pictures from a roll of film. Also available is the so-called super slide, which is simply an extra large transparency in the standard 2" x 2" slide holder. This would be an advantage when you wanted to show slides in a very large room. A new size slide (smaller than 2" x 2") is now available to use with the recently developed miniature cameras which take 110 size cartridge film.

2. Slides are available in both black and white and color, but because of pricing breakthroughs most slides are made in color. It costs about 20¢ to 25¢ a slide, to purchase and have developed, for each picture you shoot.

3. Many slide projectors can be adapted to show filmstrips.

4. Slide projectors which normally use trays or discs of slides can be operated by placing a single slide in a carrier and then showing it, removing the slide and then showing another. This is a good feature when you are selecting slides to be included in a tray or disc of slides. For example, both the Kodak Carousel projector and the Sawyer Rotomatic slide projector can be operated in this manner.

Kodak Ektagraphic Carousel slide projector with remote control.



5. Most slide projectors can be operated manually with remote control or with timed operation. Remote control allows you to stand away from and operate the machine to show slides, either forward or backward with the use of a switching device that you hold in your hand. Many projectors can be set with an automatic timer which changes the slide every 5 seconds, 8 seconds, or 15 seconds (as in the case of the Kodak Carousel).

6. Most of the later models of slide projectors have automatic focus. As a slide drops into the slot to be projected on the screen, it is pushed up against a stop. This means simply that every time a new slide is projected it is exactly the same distance from the lens and will always be in focus (provided the camera was in focus when the slide was shown originally). When you use the Carousel or Sawyer slide projectors you will hear a little whirring noise just as the slide is dropped into the slot. This means that a device is pushing the slide up against the stop so that it remains in focus.

7. Most slide projectors are adaptable for accessories. They can be used with a dissolver--instead of a slide abruptly leaving the screen and a blank screen showing another slide abruptly coming on, the dissolver will dissolve a slide slowly and bring the new slide in slowly so that there is more continuity between the flow of slides. Another option is a device that allows the slide projector to be advanced by a tape recording or disc record. An inaudible pulse put on the tape or record when it is recorded automatically operates the projector. This allows the narration to proceed in synchronization with the slide presentation. As the narration changes so do the slides.

8. Most slide projectors use quartz iodine lamps for very long lamp life. In addition they tend to require very little maintenance. The equipment is generally quite rugged and will last a very long time.

Among the advantages and disadvantages of slide projection are the following:

1. Slides are relatively inexpensive when self-produced and are relatively easy to produce by the amateur photographer. As was pointed out before, raw film stock for slides can be purchased and developed for about 20¢ to 25¢ per shot. The cameras that can be used to make slides range in cost anywhere from the Kodak Instamatic at around $20, all the way up to the most sophisticated 35mm camera. However, there are many cameras between the simplest and the most complex which are relatively easy to use and make excellent slides. As you can see, it is not very difficult for individuals to produce slides to go along with presentations they are designing.

2. Slides are available from commercial producers. While they cost a bit more than a filmstrip, slides are much less expensive than 16mm film or prepared overhead transparencies. It is often worth the effort to look for commercially made 2" x 2" slides which will accomplish your objectives.

3. Slide presentations are equally appropriate for individuals, for large groups, or for small groups. Furthermore, slide projectors can be operated in any situation e.g., the large auditorium, the small group, or the simple handheld viewer.

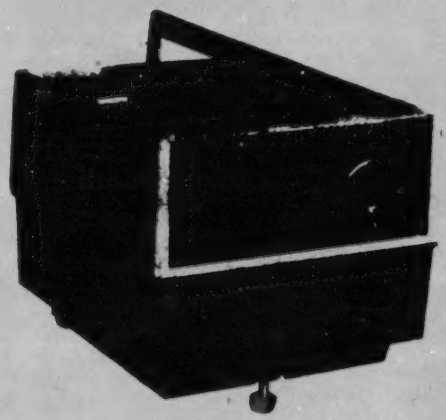
4. Slides can be conveniently stored in trays such as the Carousel tray. On the other hand, slides are very inconvenient to store and retrieve when they are stored individually, without the benefit of some type of tray. Good procedure and practice dictates the use of trays when using and storing of slides.

5. Slides can be shown at any pace and are easy to edit. The reason for this, of course, is that slides are stored individually in a tray. Thus the person who is operating the slide projector is able to look at a new slide whenever he is ready to view it. In other words, slide viewing is learner-paced. Also because the slides are individual the presenter is able to remove some slides

if they become dated or if better slides become available. Filmstrips do not allow for this kind of editing--it is very difficult and not recommended to cut and splice a filmstrip if you want to eliminate or rearrange the sequence of some frames. In summary, slides lend themselves very well to learner or presenter control and are easy to edit.

6. Slide projectors are easy to operate. They are about as easy to operate as pressing a button. They very seldom need maintenance. Once the first slide is focused the rest of the slides will be in focus, assuming that the projector is equipped with automatic focusing.

7. Slides can be programmed with other media such as tape recorders to present sound with a picture. A newer development that is available now is the sound-on-slide system. This generally involves a special slide holder that has on it a recording material which allows the teacher to record up to 30 or 40 seconds of material on each slide. As the slide is projected the holder for the slide is "scanned" by an audio sound head and the narration is then played.



3M Sound-on-Slide Projector. Each slide is inserted into a miniature record which offers about 30 seconds of instruction.

Essentially, what you have is a miniature record with a hole in the middle in which the slide itself is placed. Such machines cost about $600 and each slide holder costs about 50¢ to 75¢, which makes this feature expensive. However, changes are continually being made and the cost is coming down. Eventually, this system will be more economically feasible.

Filmstrip Projection

We have now discussed the characteristics, advantages and disadvantages of the 2" x 2" slide. Let us now consider its close cousin, the filmstrip. Basically, filmstrips are like 2" x 2" slides that are joined together to form a strip. Actually the image size is only half the size of a 2" x 2" slide but the film stock is the same and even the projectors look similar.

The following are characteristics of filmstrips and filmstrip projectors:

1. The length of a filmstrip ranges from 6 feet to 9 feet and they average about 50 frames in length, that is, 50 individual pictures.

2. Filmstrips are available in either single or double frame size. Single frame means that the image is half the size of the image of the most popular 2" x 2" 35mm slide. Some double frame filmstrips are available, but they are very rare because they require a special type of projector.

3. Filmstrips are available in either black and white or color. Nowadays almost all filmstrips are made in color. Commercially available filmstrips in black and white are very rare.

4. Filmstrips, like slides and super 8mm film, are made on non-combustible, cellulose acetate stock. However, excessive heat, such as caused by an improper sized lamp, can impair or destroy the frames in a filmstrip.

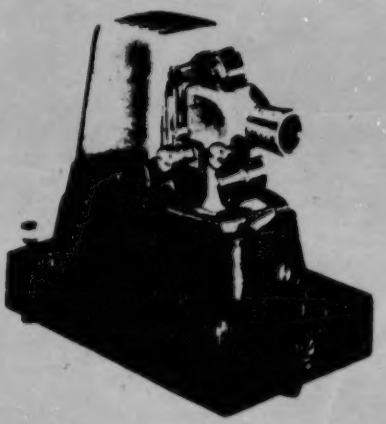
5. Filmstrips are in a fixed sequence, that is, the filmstrip frames come in a fixed order.

6. Filmstrip projectors can be either cartridge loaded or

Bell and Howell cartridge loaded filmstrip projector with remote controls.

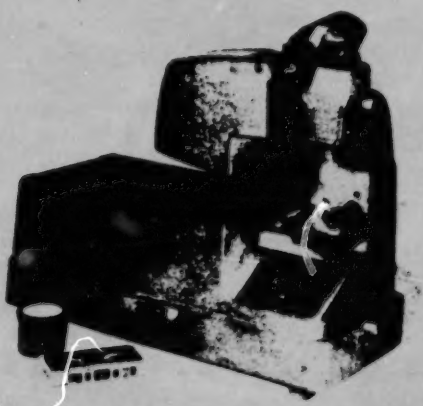
manually loaded. In other words, the filmstrip can be put into a cartridge and then the cartridge can be placed into the projector.

Cartridge filmstrips are automatically threaded, which is their primary advantage. However, it is a rather simple procedure to manually thread a regular filmstrip projector.



Manually-operated filmstrip projector. Standard 1000-c.

7. Some filmstrip projectors offer remote operation, that is, you can advance the filmstrip frame by frame with a hand held switch which is connected by a line to the projector. Also, some filmstrip projectors are adaptable



Dukane Filmstrip Projector--cassette playback unit. These are also available for records.

for accessories such as the audio tape trip. This device works on the filmstrip projector like it works on the slide projector described earlier. Again, this is

advanced frame by frame by cues that are in an audio tape which is being played on a tape recorder. This keeps the sound and slide in synchronization. Of course you could advance the frames manually as an audio buzz or bell is sounded at appropriate spots on the tape. Also filmstrip projectors can be used to show 2" x 2" slides with the use of an adapter.

Sound Filmstrips. Sound accompanying some filmstrips may be provided on disks or tape reels or on cassettes.

8. Most filmstrip projectors use quartz iodine lamps which are very bright and offer much longer lamp life than was offered previously by the older type filament bulb.

What are the advantages and disadvantages found in filmstrip projection?

1. Filmstrips, frame for frame, are the most inexpensive, commercially available non-print media. Prepared filmstrips generally cost between $6 and $10 for about 50 to 60 frames. This means that you will be paying 12¢ to 15¢ a frame for material that is already shot and developed.

2. Filmstrips are available commercially in literally thousands of titles. They are available from commercial filmstrip publishers, education film libraries, and often they are available free from industry or governmental organizations.

3. Filmstrips are equally appropriate for individual, small group, or large group use. They can be shown in large auditoriums, or in areas as small as a study carrel or a handheld viewer.

Independent study with a filmstrip.

4. Silent filmstrips can be shown at any pace, since the rate that the film advances through the projector is controlled by the user. However, filmstrip frames are in a continuous fixed sequence and, therefore, are very difficult or impossible to edit. It is almost impossible to cut up a filmstrip and splice it if you want to eliminate or add a few frames or rearrange them.

5. Filmstrips are very easy to store and retrieve. You can store many filmstrips in a very small area. In addition, the filmstrip containers are easy to mark for identification.

6. Filmstrips can be programmed for use with other media, e.g., a tape recorder or a record player.

7. Filmstrips are very difficult to self-produce without the use of specialized equipment. Most businesses and governmental organizations do not have the single frame cameras that must be used when a normal filmstrip is being made, consequently, they do not attempt the production of filmstrips, but make 2" x 2" slides instead.

8. Filmstrips are not an appropriate medium when motion is desired. They can do almost everything motion picture film can do except show motion.

9. Filmstrips are increasingly available on the market in combination with audio tapes or records. Usually a filmstrip with a record will sell for about $25 to $30. It is easy to see that you can buy 8, 10, or 12 filmstrip-record combinations for what one 16mm film would cost and the only thing you would lose is motion. On the other hand, you would gain learner control of the pace of the presentation.

10. Utilization "rules" for effective use of filmstrip and slide projection.

    A. Make sure the filmstrip(s) or slide(s) matches the objective(s)
    B. Preview all frames before showing
    C. Preplan the viewing situation and use of equipment
    D. Follow up presentation with audience participation.

Overhead and Opaque Projection

Introduction

We have now talked about the types of projection that rely on photographic film. The other types of still picture projection that we will present are opaque and overhead projection. The opaque projector has been around for some time, but the overhead projector is as recent as World War II, and has come to be very popular. In fact, the overhead projector has replaced the opaque projector, in some situations, for reasons which we will discuss later. Many organizations now have an overhead projector. And while slides and filmstrips are very appropriate for individualized instruction, generally opaque and overhead projection are more appropriate for group projection. The major differences between the overhead projector and the opaque projector is that the overhead projector usually is used with transparent materials with the light shining through the material and

Beseler Opaque Projector.

and then striking the screen. The opaque projector, as its name implies, reflects light from "solid" materials (that which you can't see through) onto the screen, e.g., photographs, pictures taken from magazines, business reports, sales brochures, pages of reference books, etc.

Overhead Projection

3M overhead projector.

The overhead projector is so named because it throws a picture over and above the shoulder of the presenter who utilizes the projector and allows her to face the audience as she uses it. Overhead projection is a relatively new medium. It was first developed during the early part of World War II and was used rather extensively in military and industrial training situations thereafter. During the 1960's, overhead projectors became very

popular in the public schools and now almost every teacher uses them. Sometimes you will hear the overhead projector referred to as an "electric chalkboard." This is because the overhead projector can be used in much the same way as a chalkboard for such things as illustrating the solving of a problem, giving schedules, administering a "pop" quiz, outlining information, etc.

There are four distinguishing characteristics of overhead projection:

1. An overhead projector is used in the front of a room: the projector is generally placed in front of the audience. The image to be shown to participants is projected over the presenter's shoulder onto a screen. Most other projectors are used at the back of a room and project images over the heads of the participants.

2. An overhead projector projects large transparent materials, materials up to 10" x 10". Most transparencies measure 8 1/2" x 10".

3. Many overhead projectors are equipped with an acetate roll, mounted on the projector adjoining the glass "stage." When the presenter wants to add more information he can do so by turning a roll and getting more clear acetate material to write on instead of having to erase what he has already written.

Note the acetate roll on this Beseler Overhead Projector.

4. Another characteristic of overhead projectors is that they can be used with prepared transparencies or as an "electric chalkboard". (We discussed the electric chalkboard concept earlier.) We want to add here that the presenter can write on an acetate sheet or roll with a felt tip pen, pencil,

crayon or marking pencil. Using the overhead projector as an electric chalkboard is very convenient for the presenter and has advantages for the audience too. A major advantage is that no matter where a member of the audience is sitting, he will be able to see satisfactorily what is being written because the overhead projected image is not affected by glare like a chalkboard is. When used with prepared materials, the overhead projector can be used with such items as transparencies and clear and translucent plastic devices that we will talk about later in this presentation.

5. The next characteristic of overhead projection is that because of the size of the machine, the size of the image projected on the screen, and the type of material suitable for projection, the overhead projector is best suited for group presentations rather than individualized instruction. Rarely would you see one participant using an overhead projector. They are almost always used in group situations.

There are seven advantages to overhead projection that make it very useful for presentations:

1. Overhead projectors are very easy to operate and users require very little training in order to use them effectively. Basically, all that is required is to place the material to be projected on the screen (no threading!), turn the projector "on", place it in such a way that the image fills the screen, and focus it. Also the projector requires very little maintenance as the bulbs are very long lasting--over 25 hours.

2. The overhead projector, which is used in the front of a room, enables the presenter to face his audience. In other words, as he writes on a piece of acetate or utilizes prepared transparencies, he is always facing the group. As you are well aware, when a person uses a chalkboard he has to turn his back to the class. This is very poor presentation technique.

3. The overhead projector can be used in a normally lighted room. Obviously the picture would be brighter and if color were used it would show up better in a room that had been dimmed a bit. But by and large the overhead projector is very well suited to a room that is normally lighted or even brightly lighted.

4. Overhead projection materials can be prepared very easily. A person can write on a sheet of acetate plastic using a marking pencil such as a "china" marker. A transparency can be produced from a line drawing by taking a white

paper with a line drawing on it and a sheet of special acetate and then running them through a Thermofax machine. The image on the line drawing will be etched onto the piece of plastic acetate.

5. Overhead projectuals are available commercially for a wide variety of subjects. Catalogs are available in public school media centers.

6. A polarization device can be attached to the lens of an overhead projector, which, when utilized with a transparency made with a polarized film, can produce the illusion of motion. This is particularly good for such things as tracing the flow of blood through the body or to show trends on a sales chart.

Polarization device attached to overhead projector to give the illusion of motion.

As with many other types of media, there are disadvantages to utilizing the overhead projector.

1. The commercially produced overhead materials are considerably more expensive frame for frame than other projected still picture film such as filmstrips and slides. A commercially produced overhead projectual can cost anywhere from $3 to $4 or $15 to $20 depending on the process that was used to make the transparency and the number of overlays included in the transparency. We will have more to say about overlays later.

2. Most overhead projected materials are limited to line drawings.

3. In overhead projection, "keystone" distortion is a problem. By "keystone" distortion we mean that the picture is not square on the screen. In order for the picture to be square on the screen the projected image must strike the screen at an angle of exactly 90°. In overhead projection the projector is usually lower than

A mild example of keystone distortion. Note that the image is wider at the top than the bottom.

the height necessary to produce this angle to enable the presenter to work on its top. Therefore, as the image is reflected onto the screen, it hits the screen at an angle somewhat off from the desired 90° angle. This means the picture is wider at the top than it is at the bottom. Keystone distortion can be eliminated most easily by tilting the top of the screen forward. This has the effect of putting the image at a 90° angle with the screen.

4. The next point, which was mentioned earlier, is that the overhead projector doesn't lend itself very well to individualized use.

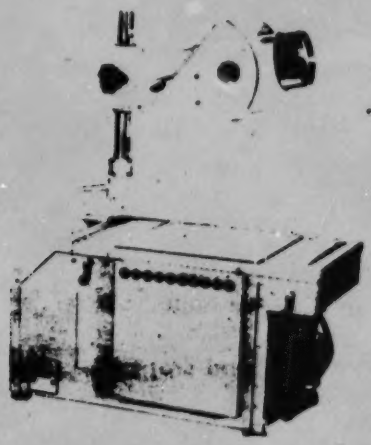
Just what types of materials can be used with the overhead projector? We have already discussed some of them and we will now talk about some others and perhaps amplify on some that we have mentioned earlier.

1. The overhead projector can project "transparencies", which are line drawings on acetate plastic sheets, either commercially or teacher-prepared. Whatever you write on the transparent sheet will show up on the screen. Marking pencils, grease pencils, china markers, crayons, magic

markers and india ink are all writing devices which will work on the acetate sheets.

2. Other items that can be projected on an overhead projector are transparent plastic models and devices such as plastic rulers and protractors. In effect, the overhead projector magnifies the device you are working with for the audience to see. Companies have been coming out with models such as engines done in clear plastic with the various movable parts in different colors.

3. Thermocopy transparencies are also used on the overhead. These are prepared by running a special kind of acetate plastic sheet and a line drawing through a Thermofax copier. The final product will be a high quality projectable transparency of what was drawn on the paper master. If you are using a printed message on your transparency and want to use a typewriter, remember to use a primary typewriter (extra large type) which is available in any elementary school because regular size type doesn't show up very well on the transparency.



Beseler overhead projector for large rooms and auditoriums.

4. An interesting overhead projectual is the clay coat lift. This method enables you to take a picture out of a magazine or book and project it onto a screen. Magazines like Arizona Highways, National Geographic and even Playboy magazine (and, we suspect, Playgirl) have very high quality paper and would "lift" very well onto a transparency. This process is done simply by taking a piece of adhesive plastic like "contact" paper, placing it over the picture you want to lift (making sure the plastic adheres to the picture), then placing this into a pan of

water with some detergent in it. After a few minutes peel or rip away the residue and you will have a transparency (at least after you've experimented a few times.) In essence, you have taken an opaque picture and made it transparent enough to utilize on the overhead projector. Of course, the picture that was in the magazine exists no longer. You simply lifted the ink right off the page.

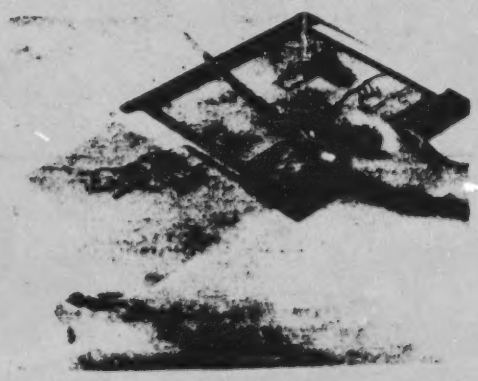
5. Very high quality transparencies can be made by using the diazo or ammonia process. This is a rather time consuming process in which different colored films are used and developed by putting the film into a jar of ammonia. Commercially made transparencies are usually produced in this manner.

6. Projectuals can be used which give the illusion of motion. This is called the technimation process. This process utilizes a special polaroid film which is placed on a transparency and as a polaroid disc spins in front of the projector lens it gives the illusion that whatever is highlighted utilizing the polaroid plastic is in motion. Transparencies with this feature are quite expensive, and the instructor using this process will have to place a spinning device on the lens of the projector each time he wants to use it.

There are at least five special presentation techniques that are effectively used with the overhead projector:

1. In the overlay technique a transparency is used and another one (or more) is placed directly over it to highlight an additional scene. This can be illustrated best by using a map study as an example. The basic transparency could be one of the United States and the first overlay might be a map showing where all the known coal

A transparency with "overlays".



resources are located. Another overlay might show the major population centers, still another could locate all the major rivers. Overlays are also effectively used to highlight the interrelationships of certain phenomena.

2. Another presentation technique that can be used is the progressive disclosure or reveal technique. This involves placing a piece of paper or cardboard between the projector and the projectual and progressively revealing whatever you want the audience to see by showing parts of the transparency instead of revealing the whole "show" at once. Also, the presenter can highlight whatever he is showing by simply turning the machine on and off when changing projectuals. The bright light suddently hitting the screen is a good attention-getter.

3. The presenter can prepare materials ahead of time and use them each time that he or she is making a presentation. This is a better practice than writing something on the blackboard which will have to be erased later.

4. Two dimensional objects can be projected very well in silhouette. This can be done simply by taking an opaque object and placing it on the overhead, which will cause the object's silhouette to be projected on the screen. Three-dimensional objects can be used in much the same way if the teacher uses a mirror.

"Things" as well as flat materials can be shown utilizing the opaque projector. Note the dark room.

Opaque Projection

Let us turn now to opaque projection. Opaque projection allows one to project non-transparent materials such as flat pictures, drawings, photographs, illustrations and certain other objects for group observation. The opaque projector is rather bulky and heavy. (It resembles a miniature cannon!). It is large because it contains a large bulb (and consequently a large fan to cool the bulb) and a series of mirrors. If you have seen one, most likely you have seen it while you were a student as it is not nearly as popular as it once was. While the overhead projector

Projection Optics Co.

opaque projector.

largely replaced many of the uses of the opaque, the opaque has some rather unique advantages which we will talk about later.

There are two main characteristics of opaque projection:

1. The first is that an opaque projector projects flat, two dimensional materials; which are opaque (non transparent).

2. The other characteristic is that printed materials or pictures require no special preparation to show. You merely place the item you want to show in the projector, move the projector forward or backward so that the image fills the screen, and focus it.

The four advantages of the opaque projector are as follows:

1. Opaque projectors are simple and easy to operate. All that is required is to turn the machine on, place the material to be projected in a slot at the bottom of the machine, and then focus it. Many machines have a built-

in pointer which the presenter can use to point out something that he wants to emphasize. The pointer is really just a movable light spot that is reflected on the screen.

2. Opaque projectors require very little maintenance.

3. Pages from books can be projected without removing the pages from the book. However, you must be very careful when you use plastic coated materials because they can be damaged by the intensity of heat generated by the opaque projector.

4. The opaque projector is particularly good for making enlarged tracings onto a blackboard, a bulletin board, or on paper or cardboard. Teachers often have their students use opaque projectors to trace maps.

At least seven disadvantages are associated with the opaque projector.

1. We have already mentioned the first--that plastic and other materials that could be heat damaged can't be used in an opaque projector safely.

2. Opaque projectors are clumsy, heavy, and difficult to transport.

3. They require an almost totally darkened room.

4. It is hard to use an opaque projector and expect your audience to be able to take notes.

5. Opaque projectors produce a limited quality image. Unless the room is very dark the image reflected on the screen doesn't show up well.

6. Light seepage from most of the opaque projectors is very annoying to those in the audience who happen to be sitting near the projector. The carrier that holds the book or paper that you are reflecting emits light and this light is particularly annoying as the room becomes darker.

7. The opaque projector can't produce an acceptable image when it is either too close or too far away from the screen. In other words, the distance that the machine is placed from the screen is extremely critical. Zoom lenses are not available for the opaque.

8. The presenter can't face the audience when using an opaque projector, as he can with an overhead projector. With the opaque projector the presenter has to look at the screen to see what is being projected just as the audience does, consequently, her back is toward the audience while she is using it.

Other types of picture projection include micro-projection, the projection of miscroscopic slides on a screen so that the group can see what is normally seen in a microscope by only one person. Microfilm and microfiche are other forms of printed material which are finding acceptance in many libraries. Microfilm and microfiche are both items that you will learn more about later in a module in this course.

Summary

In summary, then, for still picture projection we can say that one of the definite advantages of this kind of projection is that it makes possible individual or group viewing of projected still pictures for however long the audience wants to look at that picture.

Other advantages include the great variety of still pictures which can be used, the availability and relatively low cost of materials for still picture projection, and the convenience and ease of operation of still picture projection equipment.

Like all other kinds of media, the effectiveness of still picture projection depends a great deal on just how the projection is carried out and on the objectives that the projection is to meet.

Post-Test for Area 1

Directions: Circle the letter of the correct answer below.

1. Which of the following is not a characteristic of filmstrip projection?

   A. filmstrip projectors can be used to show 2 x 2 slides
   B. filmstrips are in a fixed sequence
   C. filmstrips are available in single or double frame size
   D. filmstrips must be handled with care as they are made of combustible cellulose acetate

2. Which of the following is not a characteristic of filmstrip projection?

   A. filmstrips can be shown at any pace
   B. filmstrips can show motion
   C. filmstrips are not generally produced by teachers
   D. filmstrips are in a continuous, fixed sequence

3. Which of the following is not a characteristic of slide projection?

   A. each slide must be focused separately
   B. standard slide size is 35mm double-frame
   C. slides are available in black and white or color
   D. most slide projectors can be operated manually or automatically

4. Which of the following is not a disadvantage of slide projection?

   A. slides are difficult to store and retrieve individually
   B. frame for frame slides are more expensive than filmstrips
   C. slides are easy to edit

5. Which one of the following is an Effective Utilization Rule for filmstrips or slide projection?

   A. always combine an audio tape with a visual presentation
   B. preview all frames or slides before showing
   C. the presenter should make directive comments for each frame
   D. show each frame for the same amount of time

6. Which of the following is not characteristic of overhead projection?

   A. can be used as an electric chalkboard
   B. can project opaque materials
   C. can project transparent materials up to 10" x 10"
   D. can be used at the front of the room

7. Which of the following is true of overhead projection?

   A. illusion of motion is available with polarization device
   B. transparencies can be lifted from pages of magazines which are in color
   C. projector can be used in a lighted room
   D. A and B above
   E. B and C above

8. Which of the following is not one of the types of projectuals that can be used with the overhead projector?

   A. transparent plastic models and devices
   B. filmstrips
   C. claycoat lifts
   D. transparent plastic sheets

9. Which of the following is a presentation technique appropriate to the overhead projector?

   A. reveal (progressive disclosures)
   B. prepared scroll
   C. 2-dimensional objects in silhouette
   D. All the above
   E. None of the above

10. Which of the following is a characteristic of opaque projection?

    A. polarization device can produce an illusion of motion
    B. projected materials are limited to line drawings
    C. printed materials require no special preparation
    D. can be used as an electric chalkboard

11. Which of the following is an advantage of opaque projection?

    A. complete book pages can be projected without removal from book
    B. plastic and materials prone to heat damage cannot be used
    C. projector image deteriorates with increasing or decreasing distance from screen
    D. the presenter must place back to class when operating projector

12. The biggest reason why overhead transparencies are found in many presentation areas in preference to other still projection materials is that:

A. they are the least expensive
B. they are easily prepared prior to use
C. they are better quality image producers
D. they are easier to transport and store

13. You are conducting a sales seminar and want to select some commercially available projectuals for participants to look at individually. You want to get the most number of images for your money and they must be in color. Which medium below should you select?

A. overhead
B. opaque
C. slides
D. filmstrips

14. You want to film some local industries and then make an audio tape to go along with the film or snapshots. You expect to use the completed materials with individual participants in the training seminars you conduct. Which kind of medium below would be best for you to prepare?

A. filmstrips
B. slides
C. transparencies
D. posters

15. You want the participants in your class on industrial safety to look at some visual media. However, you want them to do this individually and you also want to change (and perhaps rearrange) the visuals frequently. Also, because of storage problems, you can't use flat pictures. Which kind of medium below would you choose?

A. transparencies
B. slides
C. filmstrips

16. You conduct labor relations seminars and there is a page from a book that you want to show to your whole class. You can't tear the page out and you do not have a Thermofax machine. Which still picture projection device below would you choose?

A. overhead
B. opaque
C. filmstrip
D. slide

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Post-Test Key

Question Number	Correct Response	Module Number	Area Number	Behavioral Objective#
1	D	2	1	3
2	A	2	1	4
3	A	2	1	1
4	C	2	1	2
5	B	2	1	5
6	B	2	1	6
7	D	2	1	7
8	B	2	1	8
9	D	2	1	9
10	C	2	1	10
11	A	2	1	11
12	B	2	1	7
13	D	2	1	12
14	B	2	1	12
15	B	2	1	12
16	B	2	1	12

To consider yourself competent in this area, you should not have made more than two errors.

Pre-Test for Area 2
(Operation of Standard 500 Filmstrip Projector)

SET UP

1. Install filmstrip guide
2. Thread filmstrip to feed from top
3. Turn on fan and lamp
4. Describe how to change image size on screen
5. Frame and focus image
6. Adjust elevation control

OPERATE

1. Operate pointer
2. Advance filmstrip by frames to end
3. Remove filmstrip guide
4. Rewind filmstrip correctly and put in case
5. Install slide carrier, insert slides, show slides, remove slide carrier

TAKE-DOWN

1. Switch lamp off, leave fan on
2. Lower elevation screw
3. Rack lens in
4. Turn lamp off when cool enough

QUESTION

Demonstrate how you would change a projector bulb.

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Pre-Test for Area 2 (Operation of Kodak '850' Carousel)

SET UP

1. Attach power cord to projector and wall outlet
2. Turn lamp switch on. Describe when it is appropriate to use the high lamp setting as opposed to the low lamp setting
3. Adjust elevation

OPERATE

1. Install slide tray on projector
2. Adjust image size to screen and focus
3. Advance and reverse tray (showing a slide) by using buttons on side of machine
4. Connect remote control cord and advance and reverse slides
5. Remove tray from projector by returning tray to "0". Describe how to remove tray when slide is jammed.
6. Operate timer on 8 second interval
7. Place stack loader on projector, edit 3 slides using loader
8. Insert filmstrip adapter in projector and show 2 frames of a filmstrip

TAKE-DOWN

1. Turn off machine
2. Remove filmstrip adapter
3. Lower elevation
4. Retract lens
5. Remove cords

QUESTION

How would you change the projector bulb?

Pre-Test for Area 2(Operation of the Overhead Projector)

1. Turn on projector and select appropriate projector to screen distance for obtaining a correct image size.
2. Keep visuals "square on the screen".
3. Adjust screen to eliminate Keystone Distortion.
4. Focus image
5. Turn off lamp

QUESTION

How would you change the projector bulb?

Pre-Test for Area 2 (Operation of the Opaque Projector)

1. Turn on projector and select appropriate projector to screen distance for obtaining correct image size.

2. Project flat materials using the roller. Focus.

3. Project a page from a book by lowering and raising the platten. Focus.

4. Project small objects. Focus.

5. Use pointer.

QUESTION

1. How would you change the projector bulb?

2. What kinds of materials should you not attempt to project?

3. How could you use opaque projector to make an enlargement of a drawing or map.

Area 2--Behavioral Objectives for Operating the Standard 500 Filmstrip Projector

1. Given directions to set up a filmstrip projector for filmstrip viewing, the learner will:

   A. Remove projector from case
   B. Plug in power cord
   C. Turn on lamp
   D. Adjust projection distance (projector to screen distance)
   E. Adjust elevation (height) screw
   F. Install filmstrip adapter
   G. Thread filmstrip
   H. Focus image
   I. Adjust framing
   J. Advance filmstrip to first frame
   K. Switch lamp off

2. Given directions to operate a filmstrip projector, the learner will:

   A. Switch lamp on
   B. Advance each frame
   C. Refocus and reframe as required

3. Given directions to take down (disassemble) a filmstrip projector, the learner will:

   A. Switch lamp off
   B. Rewind the filmstrip and replace in its case
   C. Lower the elevation screw
   D. Rack (retract) the lens (focus control) all the way in
   E. Coil the power cord
   F. Replace in case

4. Given directions to set up the Standard 500 Projector as a 2 x 2 slide projector, the learner will:

   A. Remove the slide carrier from its case
   B. Install the slide carrier on the projector

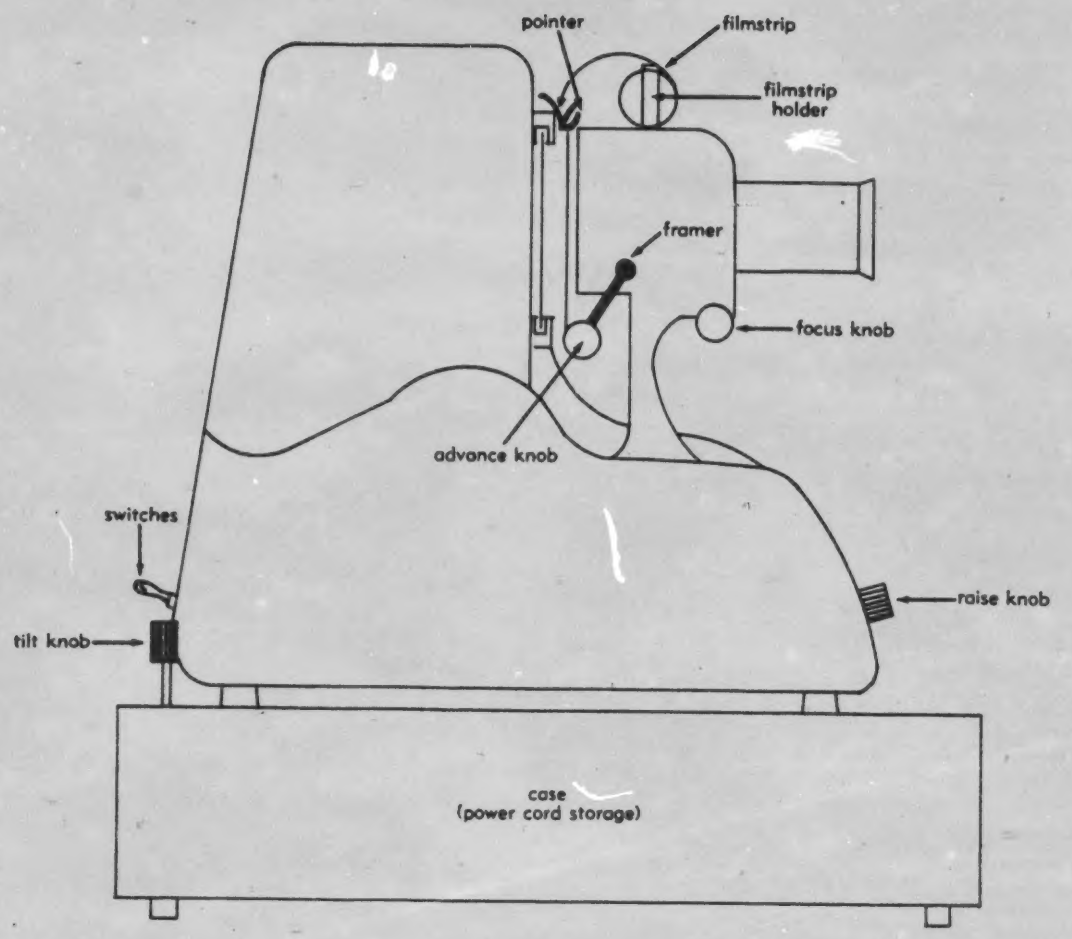
5. Given directions to operate the Standard 500 Projector as a 2 x 2 slide projector, the learner will:

   A. Switch lamp on
   B. Insert slides properly (right side up and forward)
   C. Push slide carrier into projector
   D. Pull slide carrier out to projector to receive next slide
   E. Retract final slide with fingers

6. Given directions to take down (disassemble) the Standard 500 Projector used as a slide projector, the learner will:

   A. Switch lamp off
   B. Remove slide carrier and replace in case
   C. Lower elevation screw
   D. Rack lens to "in" position
   E. Coil power cord
   F. Replace projector in case

Illustration (with components labeled) of the Standard Filmstrip Projector



Area 2--Behavioral Objectives for Operating the Kodak 850 Carousel Slide Projector

1. Given directions to set up the Carousel Slide Projector, the learner will:

   A. Identify storage compartment on sketch or actual projector and describe the procedure for opening and closing this compartment
   B. Identify power cord
   C. Identify power cord outlet on projector
   D. Attach power cord to projector and insert in wall outlet
   E. Identify lamp switch
   F. Describe situations in which the low, as opposed to the high lamp setting, should be used
   G. Identify elevation button and state its purpose
   H. Identify Kodak Carousel slide tray
   I. Load Carousel tray by:

      a. removing lock ring
      b. checking to see that notch on bottom movable part of tray is engaged in lock on stationary part of tray
      c. orienting 5 marked or unmarked slides correctly and placing them in the carousel tray
      d. replacing the lock ring

2. Given directions to operate the Carousel Slide Projector with the tray, the learner will:

   A. Identify gate index on projector
   B. Identify the numbers on the carousel tray
   C. Place carousel tray on projector
   D. Identify manual advance and reverse buttons
   E. Identify focus knob
   F. Identify select bar
   G. Turn lamp on and center the light on the screen
   H. Manually advance, focus and manually reverse 5 slides
   I. Describe procedure for removing carousel tray when tray jams
   J. Identify remote control cord
   K. Identify and insert remote control in projector
   L. Identify forward and reverse buttons on remote control cord
   M. Advance and reverse 5 slides using the remote control cord
   N. Use skip projection feature to show only certain slides in a tray

O. Identify automatic timing device
P. Project 5 slides at each of the 3 settings on the automatic timer
Q. Describe instructional situations in which the automatic timing device should and should not be used

3. Given directions to operate the Carousel Slide Projector for editing purposes and using the tray or the stack loader, the learner will:

A. Describe 3 methods of editing slides on the Carousel '850' projector and when each should be used
B. Identify projection gate on the projector
C. Edit 3 slides without using either the carousel tray or the stack loader
D. Edit 3 slides using the carousel tray
E. Identify the following on the stack loader:

a. supply channel and supply retainer
b. storage channel and storage retainer
c. hub on the underside
d. notched guide on the underside

F. Place stack loader on projector
G. Edit 5 slides using the stack loader
H. Remove stack loader from the projector

4. Given directions to operate the Carousel Slide Projector using the zoom lens, the learner will:

A. Describe the purpose of the 4-6" zoom lens
B. Remove regular lens from projector
C. Identify movable part of lens head
D. Insert zoom lens in projector
E. Project 1 slide on 3 different size screen areas, focusing each correctly
F. Remove zoom lens and replace regular lens

5. Given directions to operate the Carousel Slide Projector using the filmstrip adapter, the learner will:

A. Identify the following on the filmstrip adapter:

a. filmstrip holder
b. projection channel
c. holder for part of filmstrip already shown
d. filmstrip advance knob
e. framing level

B. Insert adapter in projector

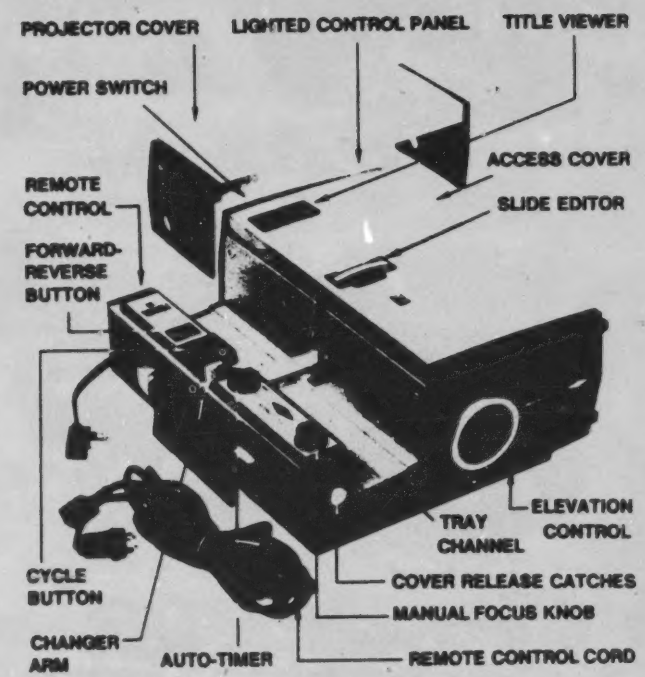
C. Insert filmstrip in adapter, focus, and frame-up filmstrip if necessary
D. Remove filmstrip from adapter, rewind and replace in container

6. Given directions to change the lamp, the learner will open the case and describe how the lamp is to be removed and a new one put in its place.

7. Given directions to take down the Carousel Slide Projector, the learner will:

A. Turn the machine off (including fan)
B. Unplug the power and remote control cords
C. Rack in the lens
D. Lower the elevation

Illustration (with components labeled)
of Kodak 850 Carousel Slide Projector



Area 2--Behavioral Objectives for Operating the Overhead Projector

1. Given the instruction to set up an overhead projector for showing transparencies, the learner will:

   A. Position the projector in front of the screen with the projector "head" facing the screen.
   B. Plug in the projector.
   C. Clean the projector platen and lenses with a soft cloth.

2. Given the instruction to project an overhead transparency, the learner will:

   A. Stand with his (her) back toward the screen and place on the projector platen the transparency included in Packet #3.
   B. Turn the machine on with the switch on the front.
   C. Adjust the projector distance from the screen so the image fills up the screen.
   D. Adjust the height of the image by tilting the projector head.
   E. Turn the focus knob until the image on the screen is in focus.
   F. Adjust the projection stand and/or screen to eliminate any keystone effect.

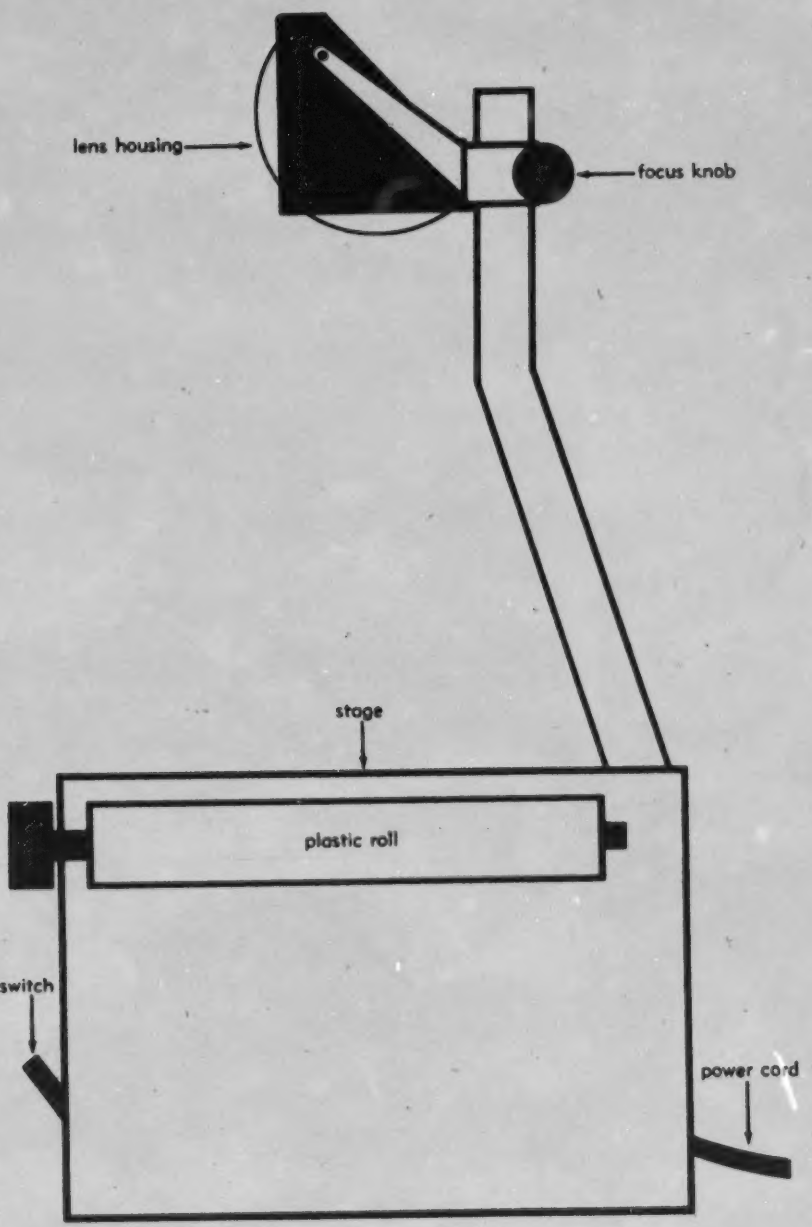
3. Given the instruction to show how to change the projection lamp (bulb) on the overhead projector, the learner will:

   A. Turn the projector off and disconnect the electric power.
   B. Gain access to the lamp.
   C. Describe how to change the lamp without touching it directly with the fingers.
   D. Close up the projector.

4. Given the instruction to take down the overhead projector after operation, the learner will:

   A. Turn off the projector.
   B. Remove the transparency from the platen.
   C. Lower the projection head by turning the focus knob.
   D. Unplug the machine after the lamp has cooled a sufficient time.

Illustration (with components labeled) of an Overhead Projector



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Area 2--Behavioral Objectives for Operating the Opaque Projector

1. Given the instruction to identify materials unsuitable for projection on the opaque projector, the learner will sort out color photo prints, plastic coated materials, and objects too large to fit on the platen.

2. Given the instruction to set up the opaque projector, the learner will:

   A. Position the projector in front of a screen with the lens facing the screen.
   B. Plug in the projector.
   C. Clean the lens with a soft cloth.

3. Given the instruction to project a picture using the roller, the learner will:

   A. Place the picture on the edge of the platen (located at the lower rear of the projector) and crank the roller handle to load the picture for projection.
   B. Make sure the image on the screen is right side up. If not, the material will have to be removed, turned around, and reinserted.
   C. Adjust the projector distance to the screen so the image fills up the screen.
   D. Raise or lower the image on the screen by extending or compressing the front legs. Most projectors require unlocking the legs during adjustment.
   E. Focus the image on the screen by turning the focus knob. If the image will not focus when the lens is out as far as it will go, the projector will have to be moved further away from the screen.

4. Given the instruction to project a page from a book, the learner will:

   A. Move the platen away from its closed position by moving the platen elevation level.
   B. Open the book to the desired page and place the book on the platen.
   C. Move the platen to the closed position so that the page to be projected is flat against the heat-absorbing glass.
   D. Adjust the projector distance to the screen so the image fills the screen.
   E. Adjust the height of the image on the screen.
   F. Focus the image by turning the focus knob.

5. Given the instruction to project a small object, the learner will:

   A. Pull out the glass tray above the platen and remove the heat-absorbing glass.
   B. Open the door and place the object on the platen.
   C. Adjust the projected distance to the screen.
   D. Adjust the height of the image
   E. Focus the image.

6. Given the instruction to point to the object and trace its outline, the learner will move the pointer handle so the light arrow traces the outline of the object.

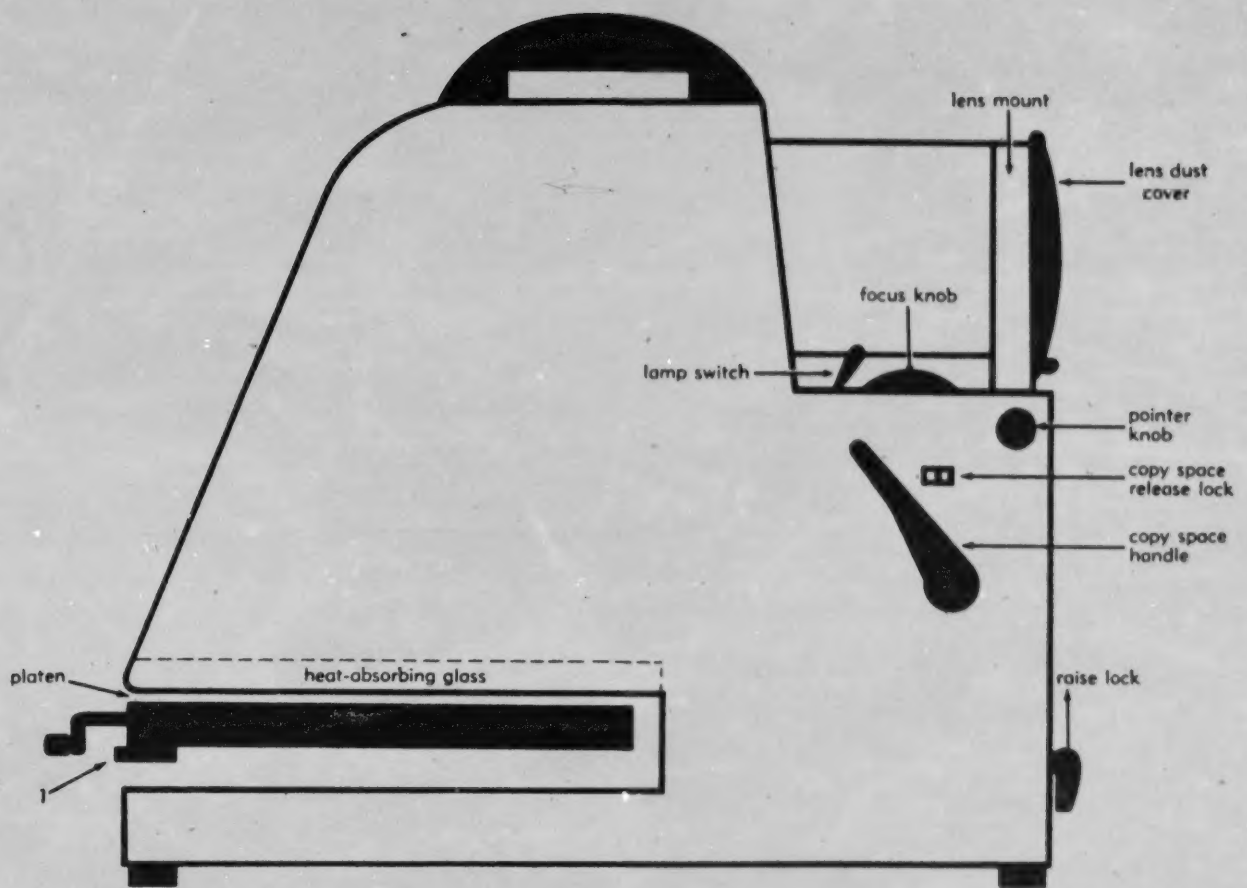
7. Given the instruction to show how to change the projector lamp (bulb), the learner will:

   A. Turn off the projector lamp but leave on the fan so that the lamp will cool.
   B. Open the door above the platen and locate the lamp.
   C. Describe how to change the lamp, without touching it directly with the fingers.
   D. Close the access door.

8. Given the instruction to take down the opaque projector, the learner will:

   A. Remove any material that has been projected.
   B. Turn the focus knob to screw in the lens.
   C. Close the lens cover (if there is one).
   D. Turn off the projector after the lamp has cooled and then unplug the machine and coil up the cord.

Illustration (with components labeled) of an Opaque Projector



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Area 3--Behavioral Objectives for Transparency Preparation

Terminal Objective: Given the instructions, the "tools", and the "AV kit", the learner will prepare an overlay transparency mounted on a cardboard mat utilizing thermo sensitive acetate film, felt-tip markers, color adhesive film, and transfer letters.

Enabling Objectives:

1. Using printed originals, the learner will use the Thermofax machine and thermo sensitive acetate film to make overlays.

2. Using the felt-tip marker, the learner will write and draw on the acetate overlays.

3. Using color adhesive film and a razor blade, the learner will add color to the acetate overlays.

4. Using transfer letters, the learner will add printed information to the acetate overlays.

5. Using Magic Scotch Tape, the learner will mount the overlays on the cardboard mat in proper sequence.

MODULE #2--AUDIO MEDIA

Introduction

Since tape recorders are among the least expensive of all media "delivery systems," and because they lend themselves to individualizing instruction, tape recorders are among the most important and potentially useful media devices that can be utilized by group leaders--but only when they are used correctly and throughout their full range of instructional applications.

Therefore, the primary goal of this module is to help you learn this full range of instructional applications and to be able to apply this knowledge correctly in using audio tape systems.

This learning module--AUDIO MEDIA--has been created to aid you in developing specific competencies in using tape recorders in presentations effectively. The procedure below has been designed to help you achieve these competencies.

Recommended Procedure You Should Follow

1. Note the Areas below and where various aspects of them are located in this MODULE:

Areas	Behavioral Objective	Type of Instruction	How Tested
1. Tape Recorder Theory and Utilization	p. 85	Audio-slide (SISC) 341-0752 or Packet #6	Test
2. Audio-tutorial Instruction	p. 97	Monograph	Test
3. Tape Recorder Operation:			
1. Wollensak 1520 or 1500	p. 121	Audio-slide (SISC) 301-0177 or Packet #7	Check-out
2. Sony 104A	p. 125	Audio-slide (SISC) 301-0753 or Packet #8	Check-out
3. Wollensak 2520	p. 129	Audio-slide (SISC) 301-0753 or Packet #8	Check-out
4. Special Techniques	p. 133	Audio-slide (SISC) 301-0753 or Packet #8	Check-out

2. Take the Pre-test for Areas 1 and 2 which begins on p. 77 to determine what you already know about this part of the MODULE. Use the key following the test (p. 83) to see how you fared.

3. If the Pre-test reveals that you need additional study in Areas 1 and 2, study the Behavioral Objectives for these areas which begins on p. 85 and work through the instruction that is offered (Monograph which begins on p. 97 of the MODULE and then Instructional Packet #6 or come to the Self Instructional Systems Center and work through set #341-0752). Note the "involvement form" which goes with #341-0752 and which begins on p. 89. This will help you and direct your attention and note-taking. Note that a space has been provided after each behavioral objective so that you can take notes while studying the instruction.

4. To see how well you are prepared in Areas 1 and 2 after instruction, take the Post-Test which begins on p. 109. Note the objective number which preceeds the correct answer on the answer key following the Post-test. They will refer you directly to objectives with which you still may be having trouble.

5. Look at the Pre-Test for Area 3 which begins on p. 117 and includes operating the Wollensak 1520 (reel-to-reel), Sony 104A (reel-to-reel), Wollensak 2520 (cassette), and the Special Techniques that go with audio tape recording. Can you do these things? If so, fine, you can successfully check out. If you can't do some or all of them, study the Behavioral Objectives for Area 3 which begin on p. 121 and work through the Instructional Packets #7 and 8 or come to the Self Instructional Systems Center and work through set #301-0177 and #301-0753. After this instruction, you should have no trouble checking out.

Selected Readings

	Pages
Brown, James W., Richard B. Lewis and Fred F. Harcleroad, AV Instruction: Media and Methods, 4th Edition, McGraw-Hill, 1973.	207-236
Dale, Edgar, Audiovisual Methods in Teaching, 3rd Edition, Dryden Press, 1969.	474-506
Gerlach, Vernon S. and Donald Pl. Ely, A Systematic Approach, Prentice-Hall, 1971.	361-364 376-384

	Pages
Wittich, Walter Arno and Charles Francis Schuller, Instructional Technology: Its Nature and Use, Harper and Row, 1973.	320-390
Kemp, Jerrold E., Planning and Producing Audiovisual Materials, 2nd Edition, Chandler, 1968.	129-136 159-160 210-212

Pre-Test for Areas 1 and 2

Directions: Circle the letter of the correct answer below.

1. The audio-tutorial use of tape recorders in instruction is:

   A. as a recorded voice of the teacher
   B. as an aid to human teachers
   C. as a teacher for specific instructional tasks
   D. as a memory trainer in speech classes

2. This picture shows a:

   A. reel-to-reel tape recorder
   B. cassette tape recorder
   C. cartridge tape recorder

3. Which of the three types of tape systems are appropriate for instructional use?

   A. reel-to-reel and cartridge
   B. cartridge and cassette
   C. cassette and reel-to-reel

4. The tape recorder can:

   A. record only
   B. play only
   C. record and play
   D. sometimes one and sometimes both (there is no standard from brand to brand)

5. High fidelity is a quality of systems that can produce:

   A. sound through two or more speakers
   B. "cleaner" sound--free of distortions
   C. greater bass and treble ranges
   D. all of the above
   E. none of the above

6. An audio system is made up of:

   A. a signal source, an amplifier, and a reproducer
   B. a tape recorder, a phonograph, and a public address system
   C. a woofer, a tweeter, and mid-range horn
   D. all of the above
   E. none of the above

7. Which of the following are not audio system sound reproducers?

   A. loudspeakers
   B. tape recorders
   C. earphones
   D. headsets

8. A device for translating electrical impulses into sound waves is called:

   A. a signal source
   B. an AM-FM tuner
   C. a reproducer
   D. an amplifier

9. Increasing small electrical impulses to the degree that they can power a speaker is the function of:

   A. a transistor
   B. a tape recorder
   C. a PA system
   D. a sound reproducer
   E. an amplifier

10. A pre-amplifier is used to amplify:

   A. extremely weak signals
   B. extremely strong signals
   C. a speaker
   D. an auxiliary input

11. Which of the following is a signal source?

   A. resistor
   B. transistor
   C. phonograph turntable
   D. speaker

12. As a signal source, the microphone:

   A. is plugged directly into the amplifier
   B. amplifies extremely small electrical impulses
   C. can directly power a sound reproducer
   D. changes sound waves into minute electrical impulses

13. An audio system which improves the reality of sound by producing sound from two different directions is called a:

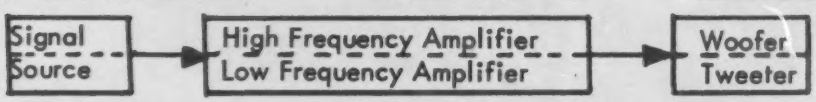
A. stereophonic system
B. monophonic system
C. high fidelity system
D. integrated-component system

14. Which of the following drawings best represents the sub-systems of a stereophonic sound system:

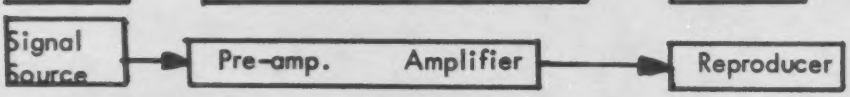
A.

B.

C.



D.



15. An audio system which uses two signal sources, two amplifiers, and two sound reproducers is known as:

A. an integrated system
B. a component system
C. a stereophonic system
D. a monophonic system

16. In recording and playback, the tape in a tape recorder must:

A. pass by the tape heads in one direction for record and the opposite direction for playback
B. pass by the tape heads in the same direction for both recording and playback

17. The dull side of an audio tape:

A. must touch the tape heads
B. must <u>not</u> touch the tape heads

18. When the speed of the audio tape is increased, the fidelity (frequency response):

A. increases
B. decreases
C. stays the same (speed has no effect on fidelity)

19. A tape recorder volume control indicating like this during recording indicates that:

during recording

A. the recording volume is set too high
B. the recording volume is set too low
C. the recording volume is set just about right
D. the recording volume is being set automatically

20. A device which automatically sets the recording volume is called:

A. an ALC
B. an AERA
C. an EIAT
D. a VU meter

21. One of the disadvantages of ALC on tape recorders is that:

A. it cannot be used for conference recording
B. most recorders don't have it
C. music loses its dynamics (crescendos and diminuendos)
D. recordings made using ALC cannot be played on machines not having ALC

22. Moving the microphone away from the speakers will

A. eliminate "feedback"
B. reduce the effect of ALC
C. produce more natural "echo" quality in tape recordings

23. Which of the following cannot be patched into (not out of) a tape recorder as a signal source?

A. phonograph
B. AM-FM tuner (radio)
C. amplifier

24. One way of duplicating audio tapes is by:

A. splitting 1/4" reel tape into two 1/8" cassette tapes
B. using a tape to tape patch
C. using a heat-transfer processor

25. Which of the following is <u>not</u> a type of equipment recommended for audio tutorial instruction?

A. amplified telephone
B. cassette audio recorder
C. language laboratory
D. wireless loop unit

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26. Identify the advantage of the dial access system:

A. student does not have to manipulate equipment
B. inexpensive
C. large and bulky
D. easy for the student to thread

27. The high cost of purchase and the lack of individual control are listed as <u>disadvantages</u> of:

A. language laboratories
B. dial access systems
C. reel-to-reel recorders
D. all of the above
E. none of the above

28. Which of the following is/are advantage(s) of the reel-to-reel tape recorder?

A. long recording time
B. high quality reproduction
C. all of the above
D. none of the above

29. Reel-to-reel recorders are:

A. more costly than cassette recorders
B. larger than cassette recorders
C. all of the above
D. none of the above

30. Low cost and compact units are advantages attributed to:

A. cassette recorders
B. reel-to-reel recorders
C. dial access systems
D. language laboratories

31. Cassette tapes are, for most practical purposes, unrepairable.

A. True
B. False

32. Phone splitters and wireless loops can use which of the following as a source:

A. tape recorders
B. overhead projectors
C. filmstrip projectors
D. all of the above
E. none of the above

33. Instruction that is primary and basic (as opposed to supplementary) and in which the learner interacts with some kind of audio media system is called:

A. audio-tutorial instruction
B. systems instruction
C. audio-visual aid instruction
D. olfactory instruction

34. Your school district has a lot of money and wants to set up an audio-tutorial system for handicapped learners (physically or mentally). Which system below would you recommend?

A. reel-to-reel recorders
B. cassette recorders
C. phone splitters
D. dial access

35. You have been asked to recommend an audio-tutorial system for a classroom in which students are hyperactive. Many students need the same information at the same time. Which system below would you recommend?

A. phone splitters
B. cassette recorders
C. reel-to-reel recorders
D. wireless headsets

36. You are teaching a foreign language and want your students to be able to repeat phrases you have prerecorded so that they can compare their pronunciations with yours. You don't have any special facilities and must use the regular classroom. Your funds are limited too. You don't mind walking around the classroom to listen individually to students

A. wireless headsets
B. EFI Card Reader or Bell & Howell Language Master
C. cassette recorders
D. language laboratory

Pre-Test Key

Question Number	Correct Response	Module Number	Area Number	Behavioral Objective#
1	C	3	1	1
2	B	3	1	2
3	C	3	1	3
4	C	3	1	4
5	C	3	1	5
6	A	3	1	6
7	B	3	1	7
8	C	3	1	8
9	E	3	1	9
10	A	3	1	10
11	C	3	1	11
12	D	3	1	12
13	A	3	1	13
14	B	3	1	14
15	C	3	1	15
16	B	3	1	16
17	A	3	1	17
18	A	3	1	18
19	B	3	1	19
20	A	3	1	20
21	C	3	1	21
22	A	3	1	22
23	C	3	1	11
24	B	3	3	4
25	A	3	2	2
26	A	3	2	3
27	B	3	2	3
28	C	3	2	4
29	C	3	2	4
30	A	3	2	5
31	A	3	2	5
32	A	3	2	7
33	A	3	2	1
34	D	3	2	8
35	D	3	2	8
36	B	3	2	8

To consider yourself competent in this module (for Areas 1 and 2), you should not have made more than three errors.

Area 1--Tape Recorder Theory and Utilization-Behavioral Objectives

Introduction to Audio Tape Systems

1. Given the need to distinguish between the traditional uses of tape recorders in instruction and the audio-tutorial approach in instruction, the learner will indicate that in the traditional approach tape recorders have been used as an aid to the presenter and in the audio-tutorial approach the tape recorder system is the teacher for very specific instructional tasks.

Different Tape Systems and Theory of Operation

2. Given representations of both reel-to-reel and cassette tape recorders, the learner will distinguish (identify) which is which.

3. Given three types of tape systems--reel-to-reel, cassette, and cartridge--the learner will identify the cartridge system as the one not generally appropriate for instructional use.

4. Given the need to distinguish between recorders and players, the learner will indicate that recorders are capable of both recording and playing back a signal while players are only capable of playing back a signal.

5. Given directions to distinguish between high fidelity systems (HiFi) and low fidelity systems, the learner will indicate that the high fidelity systems can produce a wider range of listening frequencies (below 30 hertz and above 15,000 hertz) (bass and treble sounds) so that the recorded sound is very similar to the "live" sound.

6. Given directions to name or identify the three basic functional components (subsystems) of any audio system, the learner will name or identify the

   a. signal source (or source)
   b. amplifier
   c. reproducer (or speaker)

7. Given directions to name two sound reproducers, the learner will name

   a. speakers (loudspeakers)
   b. headsets (headphones) (earphones)

8. Given directions to describe or identify what the reproducer (subsystem) does, the learner will describe or identify the reproducer as a device for translating electrical impulses into sound (waves).

9. Given directions to describe or identify what the amplifier does, the learner will describe or identify the amplifier as a device for amplifying or increasing the very small electrical impulses created by the signal source to the degree that they can power a sound reproducer.

10. Given the directions to discriminate between amplifiers and pre-amplifiers, the learner will select the description which describes the amplifier and select the description which describes the pre-amplifier.

11. Given directions to name seven signal sources, the learner will name

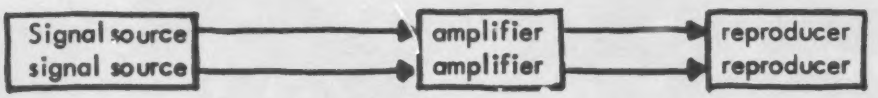
    a. the phonograph (turntable) (record player)
    b. the tape recorder (tape deck)
    c. the microphone
    d. the radio (tuner)
    e. the television
    f. the motion picture sound projector
    g. public address (sound amplifier)

12. Given directions to describe or identify what the signal source (subsystem) does, the learner will describe or identify the signal source as a device for "reading" the small electrical pulses stored on or transmitted by:

    a. a disc recording
    b. a magnetic tape
    c. a microphone
    d. electromagnetic radiation (radio waves)
    e. a motion film sound track

13. Given directions to describe the purpose of stereophonic systems, the learner will describe the increased bi-directionality of the sound sources.

14. Given directions to draw (or identify) the subsystems of a stereophonic audio system, the learner will draw (or select) the following:



15. Given directions to describe the difference (functionally) between monophonic and stereophonic audio systems, the learner will indicate that the stereophonic audio systems has two signal sources, two amplifiers, and two reproducers; that it is two monophonic systems combined into one.

16. When asked to describe briefly the theory of operation of a tape recorder, the learner will compose an answer which includes the following ideas:

    a. during recording, a plastic tape coated with magnetizable particles passes by an electromagnet (called the tape heads).
    b. the electromagnet magnetizes the tape in varying frequencies and strengths.
    c. for playback, the tape is re-wound and run by the tape heads again.
    d. the tape head "senses" the varying magnetism and sends this "signal" to an amplifier where it is amplified into listenable level sounds.

17. Given a sample of audio tape and asked which side must touch the tape head, the learner will indicate the oxide (dull) side.

18. Given a choice of tape speeds in a situation where wide frequency response (high fidelity) is required (as in recording music), the learner will choose the fastest speed available for the machine.

19. Given directions to set the recording gain control (volume control), the learner will adjust the gain control so that the level indicator registers up to the 100% modulation line on "peaks" but not into the 100% modulation (over modulation) zone.

20. Given directions to indicate the function of the ALC (automatic level control), the learner will indicate that the ALC automatically sets the recording level so that the recording is recorded at a volume neither too high (over modulation distortion) nor too low.

21. Given directions to list two disadvantages of automatic level control, the learner will list:

    a. music loses its dynamic range
    b. background noise increases during quiet pauses

22. Given an audio system that is producing a squeal ("feedback"), the learner will correct the noise by moving the microphone away from the speakers.

Student Involvement Form

Tape Recorder Theory and Utilization

1. Write the names of the two approaches in using tape recorders:

   1.
   2.

2. Instructional tapes--properly programmed--can carry out the basic instructional functions of a teacher. They are:

   1. presenting information
   2. eliciting_____
   3. _____ information to the student about the adequacy of these responses

3. A "procedure for preparing audio-tutorial lessons" might consist of the following steps:

   1.

   2.

   3.

   4.

   5.

   6.

   7.

   8.

4. A script that is written in small steps on 3 x 5 cards and includes both narration and visuals is called a _____ _____

5. In recording narration, a good general rule is to speak at a rate that is slightly slower/faster (circle one) than the normal speaking rate.

6. If a student is to operate the tape recorder, certain directions should be included to tell the student when to _____ and _____ the recorder.

80

7. The most crucial part of creating an audio-tutorial program is the _____ and_____ because it is at this stage that mistakes in the instruction are observed and corrected.

8. The following are some of the advantages of the audio-tutorial lesson:

   1.

   2.

   3.

   4.

   5.

   6.

9. The three major types of tape recording systems are

   1.

   2.

   3.

10. The tape system <u>not</u> appropriate for instructional use is the_____tape system.

11. Two advantages of the reel-to-reel system are

   1.

   2.

12. Two disadvantages of the reel-to-reel system are

   1.

   2.

13. Two advantages of the cassette system are

   1.

   2.

14. The tape player will (circle one)

A. record only
B. playback only
C. both record and playback

15. The tape recorder will (circle one)

A. record only
B. playback only
C. both record and playback

16. High fidelity refers to (circle one)

A. the number of speakers used
B. the expense and complexity of the amplifier
C. the number of stereo channels
D. the frequency range

17. A high fidelity system produces (circle one)

A. higher frequency sounds
B. lower frequency sounds
C. both higher and lower frequency sounds
D. high frequency out of one speaker and low frequency from another speaker

18. The average range of human hearing is (circle one)

A. from 20 hps to 10,000 hps
B. from 20 hps to 15,000 hps
C. from 20 hps to 20,000 hps
D. from 20 hps to 25,000 hps

19. Sounds which are higher than about 10,000 hps are mostly _____ which give music its _____.

20. All audio systems are made up of three basic or functional components. These three components are

1.

2.

3.

21. The function (job) of the signal source is to _____ _____.

22. Signal sources can be such things as

1.

2.

3.

4.

5.

6.

23. Amplifiers can be classified as two kinds:

1.

2.

24. The function of any amplifier is to _____

_____.

25. The "inputs" on an amplifier may be labeled

1. _____ or
2. _____ or
3. _____ or
4. _____ etc.

26. The "outputs" may be labeled

1. _____ or
2. _____ or
3. _____ or
4. _____ etc.

27. Some signal sources output (put out) a strong signal and some output a weak signal. Label each of the following signal sources in terms of weak or strong:

	Strong	Weak
microphone	_____	_____
phonograph	_____	_____
tape player	_____	_____
AM-FM tuner	_____	_____
television	_____	_____
motion picture projection	_____	_____

28. An audio system which has all the components included in a single cabinet is called a(n)_____ system.

29. An audio system which has its basic components in separate cabinets is called a(n)_____ system.

30. A one-channel sound system is called_____.

31. A two-channel sound system is called_____.

32. A four-channel sound system is called_____.

33. Stereophonic and quadriphonic sound systems increase the realism of reproduced sound by_____
_____.

34. Of the three sound systems discussed, the sound system most appropriate for instructional use is the _____ system.

35. The signal source for a tape recorder or player--when it is separate from the amplifier and speaker--is called a_____
_____.

36. The audio tape is made up of two layers. These are

1.

2.

37. The tape must rub up against a special electromagnet that is called the _____.

38. The dull side / shiny side (circle one) of the tape must actually touch the tape head.

39. During recording electrical impulses (circle one)

A. are generated by the tape and fed to the tape head
B. are generated by the tape head and fed to the tape

40. The tape head "prints" onto the audio tape_____ pulses.

41. A device to prevent accidentally erasing a tape by mistakenly pushing the record button is called a _____
_____.

42. Cassettes can be fixed so that they cannot be recorded by _____.

43. The general rule of thumb for selecting the tape speed is _____.

44. The two methods for setting recording volume are

    1.

    2.

45. If the volume is set too high the result will be _____ _____.

46. Two disadvantages of ALC are

    1.

    2.

47. A feedback squeal can be eliminated by_____ _____.

Area 2--Audio-tutorial Instruction--Behavioral Objectives

1. The student will be able to identify a statement describing the difference between audio-tutorial instruction and using audio media in instruction.

2. The student will be able to identify five types of equipment that can be utilized in the audio-tutorial mode.

   A.
   B.
   C.
   D.
   E.

3. The student will be able to identify statements which describe two advantages and two disadvantages of a dial access system.

   A.
   B.
   C.
   D.

4. The student will be able to identify statements which describe two advantages and three disadvantages of using reel-to-reel tape recorders for audio-tutorial purposes.

   A.
   B.
   C.
   D.
   E.

5. The student will be able to identify statements which describe advantages and two disadvantages of using cassette recorders for audio-tutorial purposes.

   A.
   B.
   C.
   D.
   E.

6. The student will be able to identify statements which describe the purpose and characteristics of the language laboratory.

7. The student will be able to identify statements which describe the purpose and characteristics of phone splitters and wireless headsets for use in audio-tutorial systems.

8. Given various hypothetical learning situations, the student will be able to select the appropriate audio-tutorial device to match the situation (considering the characteristics, advantages, and disadvantages of each of the five kinds of audio-tutorial equipment).

Area 2--Audio-Tutorial Instruction--Monograph

Prior to the Second World War, the only audio materials available to group leaders were 78 rpm records, and these records were breakable at that! The now familiar tape recorders were not generally used until the 1950's. In the last ten years, particularly, audio learning materials have undergone a tremendous increase in use. This revolution in educational methodology was brought about by the advent of the cassette recorder. And, of course, while the ease of use and relatively low cost of this kind of hardware initially caused the cassette recorder to become very popular, its very popularity has spawned a significant increase in the software (tapes) available to presenters. Initially, almost all recordings available for instructional purposes consisted of descriptions, readings of stories, poems, dramatizations of various historical events, and foreign language instruction. However, the software that is available now shows much more imagination. This has come about through a new application of audio media. You'll notice that audio tapes and records are used to help explain pictures (both projected and opaque), charts, maps, microfilm and films. In this monograph, we are going to be considering the various kinds of audio instructional experiences that are available to you and those participants you will be working with.

Since you have been involved in instructional situations for many years, it comes as no surprise to you that listening is a primary means of receiving instruction. Even in the lower school grades nearly 50% of the typical classroom day is spent by students in listening activities. At the college level, at least for many students, 90% of their day is spent in listening to lectures, discussions, tapes, etc. It should be apparent to you that while the spoken word is much used, it is also often abused. For example, it doesn't take into consideration the individual learning style of various participants in terms of their <u>rate</u> of being able to listen to a voice. In other words, for many participants to achieve complete understanding, they will have to have repeated opportunities to listen to a particular message. You can see one of the great difficulties in the lecture approach--it doesn't give the learner an opportunity to "recycle". He either gets it or he doesn't. However, with the development of convenient recording devices it is much easier for presenters and participants to overcome this barrier and thus eliminate one of the criticisms of the listening mode of achieving instruction.

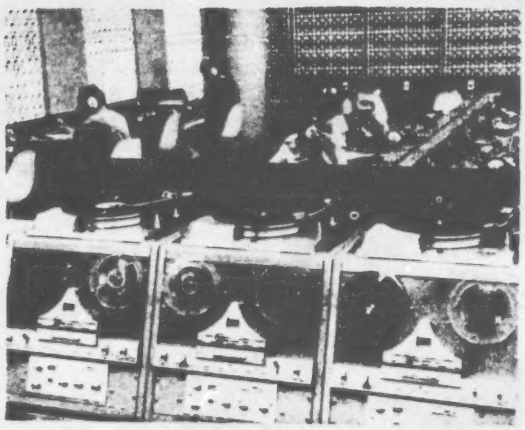
At this time maybe we should define for you what we mean by "audio tutorial." You should have no difficulty defining what audio is--that is, learning by listening. But you might be having a little difficulty with the word "tutorial." We like to think

of the audio tutorial mode of presentation as primary instruction, that is, the kind of instruction where the participants are literally tutored by the audio equipment in order to accomplish the learning objectives. The spoken message via a tape or record, in place of the lecture, becomes the primary source of instruction in this kind of application. Again, it allows the presenter to work individually with participants. The audio tutorial procedure frees the group leader for other tasks by taking over the task of presenting information and/or directions. An added advantage is that participants are able, in most cases, to cycle themselves through the learning as many times as they need to. In this theme we are going to identify five types of equipment that can be used in the audio tutorial mode. You may already be familiar with some of them, but others are likely to be new to you. The five types are the dial access system, the reel-to-reel tape recorder, the cassette tape recorder, the language laboratory, and the wireless loop and/or phone splitter.

Dial Access System

Dial access systems were very much in vogue ten to fifteen years ago. Many schools and a few industrial concerns still have them and a few of these institutions may still be considering them. The dial access system permits participants to listen to audio materials without actually manipulating any equipment. Grand Valley State College, (a four-year higher education institution located near Grand Rapids, Mich.) when it was set up some years ago, incorporated a rather elaborate dial access system. The library and other areas of the campus were equipped with study carrels containing headsets and what looked to the users like the dial on a telephone. The student would be given a schedule of lectures that had been previously taped. These lectures were played at particular times during the day and evening and students were able to sit in study carrels, put on a headset and by dialing two or three digits, listen to a lecture or other type of program. This was extended to the visual mode as well so the students would be able to listen to and watch a video tape. Later versions of the dial access system, particularly those that were controlled by computer, enabled students to dial a program at any time. In other words, the program would be broadcasted anytime that the student desired to listen to it. The student would simply dial up the program and the program would automatically be placed "on line," so to speak, and the student could listen to it.

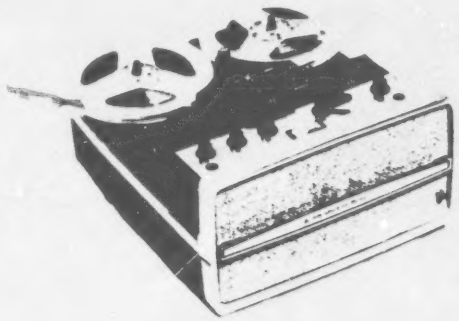
A dial access system. Participants audition, independently or simultaneously, materials contained on several different recordings.



The dial access system has two advantages. One is that the participant has remote access to the information. Another advantage is that there is no equipment manipulation by the student who wants to listen to an audio or video tape. Tape threading is done by employees who put the tapes on a master console at certain hours during the day. This latter advantage was an important one before the advent of the easy-to-use cassette tape. However, there are two serious disadvantages to dial access systems. The first is the very high cost of this kind of system. You can imagine what it costs to have a crew of workers or a computer putting tapes on players for the signals to be beamed to various study carrels. Also, the cost of constructing buildings with cables in order to allow participants to listen to these messages in a number of locations is considerable. Even study carrels themselves are not inexpensive. Another real disadvantage with the dial access system is that there is a lack of control by the participant. This is particularly damaging to this whole concept because one of the original criticisms of learning by listening was the fact that learners did not have control. As you recall in the introduction, we indicated that newer forms of equipment allow the learner to listen at his own rate. But with the dial access system, this is not possible because the program is played at a particular time. Even if the participant can dial the program at will, it is not likely that he can repeat portions to relisten to something he has missed. He has to listen to the tape all the way and then redial it. This causes him to have to listen to things he already knows. Because of these two critical disadvantages, it is a rare institution or business that is today considering a dial access system. Ten or fifteen years ago these were not serious detriments simply because there was no effective substitute available. However, with the development of the

cassette tape recorder, an acceptable substitute is very much available. We will be considering the cassette tape recorder later but before we do, we would like to present its forerunner, the reel-to-reel tape recorder.

Reel-to-Reel Tape Recorder



Voice of Music reel-to-reel

tape recorder

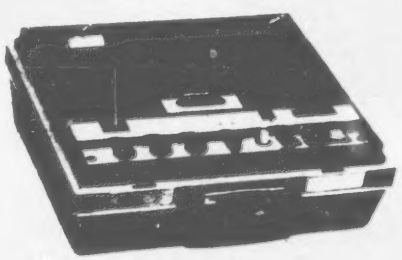
The reel-to-reel tape recorder has been used in various institutions (both educational and industrial) rather extensively since the early 1950's. While the reel-to-reel tape recorder has in many cases been replaced by the cassette recorder, it still has some specialized uses, which is why you will be learning how to operate the Wollensak 1520 reel-to-reel recorder. The reel-to-reel tape recorder uses, as the name implies, two reels; an empty take-up reel and a reel of quarter-inch iron oxide tape. The designer of this course can remember the time just after the Second World War when tape recorders utilized a wire. A sound was actually recorded on a thin piece of wire as it was running through the machine. This was certainly a much less efficient and much more costly way to achieve audio reproduction.

Reel-to-reel tape recorders are not as easy to operate as cassette recorders. However, the reel-to-reel recorder is by no means obsolete. There are three or four very distinct advantages found with reel-to-reel recordings. One of them, of course, is high quality sound. With the wider tape, which is twice as wide as the cassette, (1/4" as opposed to 1/8") and the availability of faster recording times (most reel-to-reel recorders will record at seven and a quarter inches per second), a much higher quality sound can be obtained. While this is not particularly beneficial for normal use, it is desirable in the area of music where high quality sound is desirable. Many of you are stereo buffs and we are sure you will recognize this particular advantage of reel-to-reel tape equipment. Another advantage is the long recording time available with reel-to-reel tape--up to four hours. Most cassette tapes are limited to about a half an

hour, or an hour at best. Like better quality sound, this may not be particularly important for most educational and industrial applications. The third advantage is that the participant has full control of the reel-to-reel tape recorder. That is, he or she can start it, stop it, use the fast forward, fast rewind and even do mechanical tape editing easily (see the supplemental behavioral objectives that go along with this module). Furthermore, if the tape breaks, it is very easy to repair.

The reel-to-reel tape recording system has three disadvantages, however. One of them is that the recorders are relatively expensive. A reel-to-reel tape recorder is at least twice as expensive as a cassette recorder. In fact, your instructor knows of no reel-to-reel tape recorder worthy of institutional use for less than a hundred dollars. However, many good cassette recorders are available for under fifty dollars. Generally reel-to-reel tape recorders are large and bulky. It would be virtually impossible, for example, to send a reel-to-reel tape recorder home with a participant. The third disadvantage is that a reel-to-reel tape recorder must be manually threaded, a task that requires some degree of skill. We think, however, since you either have been or will be trained on the Wollensak reel-to-reel tape recorder, you will realize that this is not really too difficult. But, on the other hand, if we are talking about sheer convenience, there is little question that cassette recorders are much easier to operate than reel-to-reel recorders.

Cassette Tape Recorder



Wollensak cassette tape recorder. Ideal for large-group use.

The third type of audio equipment that can be utilized in the audio tutorial mode is now the real "star" of the media world. The cassette tape recorder has probably done as much as any other single item in the area of media to really revolutionize things. And, why not? There have been so many breakthroughs in the development of the cassette recorder that it has become a natural for audio-tutorial purposes.

The advantages of the cassette recorder and recordings are many. One, of course, is low cost. High quality recorder-playback units can be purchased for around twenty or twenty-five dollars. Cassette recorders are small and portable.

Sony cassette tape recorder.

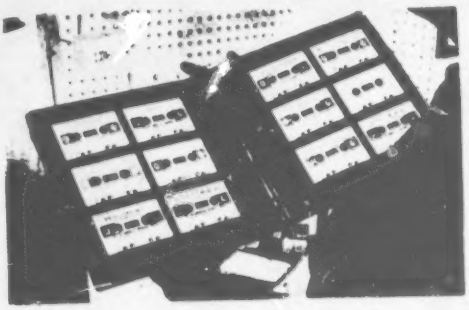
Ideal for individual use.

Cassette recorders are easy to load and play which, of course, is a big advantage for the person who tends to shy away from any kind of electrical equipment. Also, they are easily stored and retrieved.

Twelve cassette tapes

stored conveniently in a

3-ring notebook.



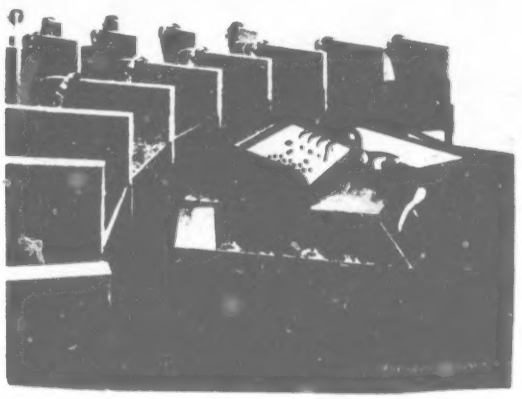
They are small, so they fit nicely on a shelf, and they are usually equipped with handles. And, of course, participants do have full control or almost full control with the cassette recorder. The machines have a fast forward and a fast rewind, as well as a stop button.

There are three distinct disadvantages of cassette recorders and recordings. The cassettes themselves are not particularly easy to repair. This is due to the small size tape (1/8") and the fact that in order to repair the tape you have to open the cassette, take the tape out of the plastic or metal container,

and then splice it and put it back in. This is a job for a professional who has had much experience doing this type of work. Repaired cassette tape is not nearly as strong as it was originally, which is not the case with spliced reel-to-reel tape. For practical purposes, then, the cassette is really not repairable. Also, cassettes are prone to jamming. Because they operate in a small space (the size of the cassette is only 4" x 2 1/2"), sometimes the tape will wrap itself around the recording head or the capstan and simply come spewing out of the cartridge. This occasionally happens with shorter length cassettes, but it is a particular problem with the longer cassette cartridges (the ones that play over an hour), which brings us to our next disadvantage. Because the size of the cassette case is fixed (4" x 2 1/2"), cassettes have limited recording time--generally one-half hour on each side. The only thing that can be done to increase the recording time is to make the tape thinner. Therefore, a cassette that records for an hour on each side uses very thin tape, and thin tapes are much more likely to jam up than are thicker tapes. We would recommend that you not use cassette tapes that run much over a half hour on each side. Last of all, cassette recordings have limited recording quality. This is because the tape runs very slowly (at 1-7/8" per second) and the tape is only half as wide (1/8" as opposed to 1/4") as reel-to-reel tape. However, we have had recent breakthroughs in tape recording equipment that make their quality much higher than they were initially. For most industrial and institutional uses (discounting music of course), the quality is high enough so this isn't generally a problem. In summary, it is our opinion that the cassette recorder offers by far the most potential for use in the audio-tutorial mode.

Language Laboratory

A language laboratory.



The language laboratory is the fourth type of equipment that can be utilized in the audio-tutorial mode. This system is a combination of audio-lingual and transitional approaches to language instruction. Tape recording materials are provided for the students speaking a language or learning to imitate some expert speaking a language, while points of grammar, background of the subject and other explanatory information are handled pretty much in a traditional manner. In a language laboratory, a learner listens to language words and phrases and then repeats what he has just heard, recording his own voice as he does so. At this point, the group leader who is at a control board manipulating the audio output to the whole class, may have the learner listen immediately to his own version of the spoken phrase, allowing him to evaluate his pronunciation and correct it if necessary. The learners listening to different tapes during the same time period, the audio-lingual method, encourages individual work.

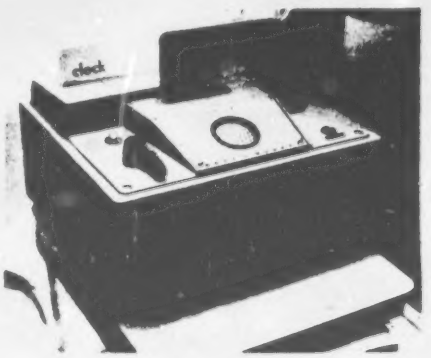
A language laboratory in operation.

Since most language laboratory systems allow the presenter to tune in on any individual at any time, learners who are having particular difficulty can be given special attention. Oral tests can be given in this manner with the group leader providing immediate feedback. And, of course, visual material such as slides or filmstrips can be coordinated with the tape lessons providing either tutorial or written stimuli to encourage particular learner responses.

Language laboratories, which are closely related to the dial access system, have been around for some years now. However, with the advent of the specialized magnetic recording devices which can perform all the principal functions of the built-in language laboratory, the language laboratory is not as prominent

in the thinking of people designing instruction as it once was. A couple of such devices that do pretty much the same thing as the language laboratory are the EFI Audio Card Reader and the Bell and Howell Language Master.

With the Bell & Howell "Language Master" device, the sounds and visual appearances of individual words can be studied and practiced. Sounds are reproduced from electro-magnetic impulses stored on the short strip of magnetizable material applied to the bottom of each word.



They both permit learners to listen while observing or reading, and practice responses can be recorded and played back for comparison and evaluation. Perhaps you have been to an elementary school classroom and have seen rectangular shaped cards going through the machine with the learner reading what's on the card into the machine and then playing it back. If so, you will understand what we mean when we describe the EFI Audio Card Reader and the Bell and Howell Language Master. Because this equipment is fairly compact, it allows learners to practice in almost any location. In other words, the students are not limited to practicing in the language laboratory itself. And, of course, these systems eliminate the need for the expensive soundproof facility which are necessary for a language laboratory.

Wireless Loop and Phone Splitter

The last kinds of equipment appropriate for use in the audio-tutorial mode are the wireless loop and phone splitter. This equipment allows a number of participants to listen to a lesson at one time. While we realize that this kind of equipment seems to violate the idea of individualization, we also recognize that there are times when information should be presented to an entire group at one time.

Obviously, you are aware that a headset can be plugged into a tape recorder, a record player, a 16mm film projector, etc. and a person can listen to the sound without disturbing anyone else who happens to be around. The phone splitter simply extends this privacy up to 6 or 8 students. The phone splitter is a small box which students can plug into the headset receptacles which allow a number of headsets to be plugged in--hence the name phone splitter.

Elementary students listening to the same lesson via a "phone splitter".

A new variation of this system is the wireless headset. The wireless headset system is a group of headsets that are constructed very much like miniature radios. Also essential to this system is a wire (antenna) which, in most applications, is installed around the perimeter of the ceiling in the presentation room. Anyone sitting within the rectangle that the antenna makes would be able to listen to whatever was being played by using the special headsets. They could get up and move about the room without the worry of dangling wires and so forth. The headset itself looks very much like a regular headset except that a

miniature radio is built in the earphone. Usually the radio is crystal controlled. That is, the learner can listen to a number of separate programs--on some models up to eighteen. This kind of convenience is expensive. The headsets alone cost up to $80 each, as opposed to $8 or so for regular headsets. The little batteries needed for each wireless headset can run up the cost too. This is the main reason why this type of system is not as popular as one might think it would be. But it does avoid the problem of a bunch of dangling cords.

Some Instructional Ideas with Audio-Tutorial Systems

We are now through discussing the five types of equipment for audio-tutorial presentations. While you were reading about the equipment we suggested some traditional uses for it; we are sure you have thought of some uses also. We now want to give you a few of the more unique uses for which you can use audio-tutorial equipment.

1. To practice and improve listening skills.

2. To give participants an opportunity to evaluate their own speech.

3. In music, to provide an objective basis for self-evaluation and improvement.

4. In business education, to dictate from a letter, for alphabetic drills, for keyboard review drills, etc.

5. In physical education, to record a coach's personal notes when he is out on the field. The tape could be played back later with the athletes present (and with expletives deleted)!

6. In art, to record a teacher's comments as he viewed students' paintings or other art works.

7. To record discussions to be played back later for additional study.

8. To record interviews when students are sent out to interview someone.

SUMMARY

The uses of the audio component are almost unlimited, or should we say limited only by the user's imagination. The items mentioned above are all in addition to its main function, to present specific information. Remember, too, that audio instruction is one of the cheapest and most convenient kinds of instruction for the presenter to use. Furthermore, it is very easily edited, as you will be aware after finishing this module.

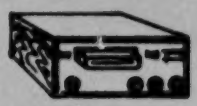
Post-Test for Areas 1 and 2

Directions: Circle the letter of the correct answer below.

1. The current trend is to use tape recorders:

   A. more as an aid to instruction
   B. less as an aid to instruction
   C. more as a tutorial device
   D. less as a tutorial device

2. This picture shows a:



   A. reel-to-reel tape recorder
   B. cassette tape recorder
   C. cartridge tape recorder

3. Cartridge recorders:

   A. are appropriate for instructional use
   B. are not appropriate for instructional use

4. The tape player can:

   A. record only
   B. play only
   C. record and play
   D. sometimes one and sometimes both (there is no standard from brand to brand)

5. To qualify for a "high fidelity" rating a sound system must be able to produce:

   A. frequencies below 30 hertz (cycles)
   B. frequencies above 15,000 hertz (cycles)
   C. frequencies below 30 hertz and above 15,000 hertz
   D. frequencies above 20,000 hertz from one speaker and below 20 hertz from a second speaker

6. Which of the following is <u>one</u> of the major functional parts (sub-systems) of an audio system?

   A. transistor
   B. amplifier
   C. turntable
   D. audio tape cassette

7. Which of the following are sound reproducers?

   A. transistors, AM tuners, FM tuners
   B. cartridges, cassettes, reels
   C. earphones, headsets, speakers
   D. phonograph turntables, radios, microphones

8. The function of the sound reproducer is:

   A. to change electrical impulses into sound waves
   B. to increase the strength (amplify) electrical impulses
   C. to magnetize the signal auto on audio tape
   D. to create biaural or stereo sound

9. A part of an audio system which increases the strength of an electrical impulse is called:

   A. a signal source
   B. a reproducer
   C. an amplifier
   D. a frequency

10. Of the two--preamplifiers and amplifiers--the only one which directly feeds the speaker is the:

   A. pre-amplifier
   B. amplifier

11. Which of the following is a signal source?

   A. AM-FM tuner
   B. woofer and tweeter speaker
   C. stereo headset
   D. pre-amplifier

12. The signal source:

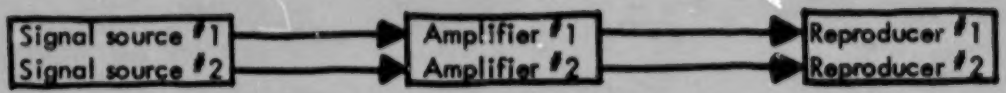
   A. is the most important of the three functions in audio systems
   B. originates the electrical impulses
   C. is the final sub-system in audio systems
   D. is the same thing as a pre-amplifier

13. A stereophonic system creates more realistic sound by:

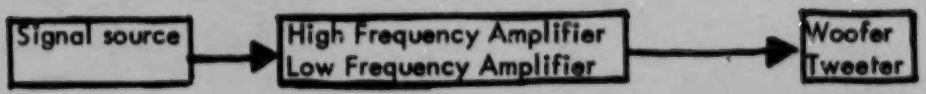
   A. increasing the frequency range--more treble and more bass
   B. increasing the number of signal sources (e.g., AM-FM, phono, etc.)
   C. increasing the bi-directionality of the sound

14. Which of the following drawings best represents the sub-system of a stereophonic sound system:

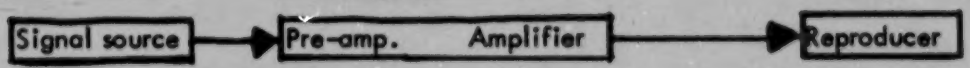
A.



B.



C.



D.

15. A stereophonic system has the following components.

A. one signal source, one amplifier, one sound reproducer
B. one signal source, one amplifier, two sound reproducers
C. two signal sources, two amplifiers, one sound reproducer
D. two signal sources, two amplifiers, two sound reproducers

16. When a tape machine tape head "senses" the varying magnetism in a tape and sends this signal to the amplifier, the tape machine is

A. recording
B. playing back

17. The shiny side of an audio tape

A. must touch the tape heads
B. must <u>not</u> touch the tape head

18. When the speed of the audio tape is slowed the effect upon frequency response is that:

A. frequency response is not as good
B. frequency response is better
C. frequency response is not effected

19. A tape recorder volume control indicating like this during recording, indicates that:

A. the recording volume is set too high
B. the recording volume is set too low
C. the recording volume is set about right
D. the recording volume is being set automatically

20. An ALC is used:

A. only during tape recording
B. only during tape playback
C. both during recording and playback
D. only with 16mm projectors

21. One of the disadvantages of ALC on tape recorders is that:

A. there is a loss of fidelity (bass and treble)
B. ALC will only work on one speed and not the other
C. the tape on playback has a "tinny" telephone quality
D. background noise increases

22. A feedback squeal is remedied by:

A. switching to ALC
B. moving the microphone away from the speakers
C. making sure the microphone connector plug is inserted properly

23. Which of the following cannot be patched into (not out of) a tape recorder as a signal source?

A. television
B. speaker
C. microphone

24. Multiple audio tapes can be copied at one pass by:

A. using a multiple tape-recording duplicator
B. using a tape to tape patch set-up
C. splitting 1/4" reel tape into two 1/8" cassette tapes

25. Identify the item that <u>is not</u> recommended for audio-tutorial instruction:

A. reel-to-reel audio recorder
B. language laboratory
C. dial access system
D. AM radio

26. Identify the advantage of the dial access system:

A. participant does not have to manipulate the equipment
B. access over distance
C. both of the above
D. none of the above

27. Identify the disadvantage of dial access systems from the list below:

A. bulky
B. lack of individual control
C. short recording time
D. all of the above
E. none of the above

28. Which of the following is/are advantage(s) of the reel-to-reel tape recorder?

A. long recording time
B. access over distance
C. high cost
D. all of the above
E. none of the above

29. Which of the following is/are disadvantage(s) of reel-to-reel recorders in audio-tutorial systems?

A. high cost
B. bulky
C. must be threaded by hand
D. all of the above
E. none of the above

30. Cassettes as a form of software are easier to store, index and retrieve than are reel tapes:

A. true
B. false
C. no significant difference

31. Cassette tapes can be said to have which of the following disadvantage(s)?

A. short recording time
B. limited recording quality
C. cassettes are essentially non-repairable
D. all of the above
E. none of the above

32. A wireless headset loop:

A. records audio information
B. utilizes headsets with built-in radio receivers
C. uses printed circuit electronics without wires
D. all of the above
E. none of the above

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33. Audio-tutorial instruction refers to instruction:

A. managed by computers
B. found in study carrels
C. which is one-to-one instruction between the presenter and the participant
D. in which the primary information is given the student through audio tape

34. You are a school nurse and you have instructions that you would like participants to listen to in groups. You have access to cassette recorders and headsets but not much extra money. Which system below would you recommend?

A. EFI Card Reader or Bell & Howell Language Masters
B. language laboratory
C. reel-to-reel tape recorders
D. phone splitters
E. wireless headsets

35. You are conducting sales training classes and you want to adopt an audio-tutorial approach to your instruction. You have very little money but your participants are adept at operating equipment and your lessons are short. Which system below would you recommend?

A. wireless headsets
B. language laboratory
C. reel-to-reel recorders
D. cassette recorders

Post-Test Key

Question Number	Correct Response	Module Number	Area Number	Behavioral Objective#
1	C	3	1	1
2	C	3	1	2
3	B	3	1	3
4	B	3	1	4
5	C	3	1	5
6	B	3	1	6
7	C	3	1	7
8	A	3	1	8
9	C	3	1	9
10	B	3	1	10
11	A	3	1	11
12	B	3	1	12
13	C	3	1	13
14	A	3	1	14
15	D	3	1	15
16	B	3	1	16
17	B	3	1	17
18	A	3	1	18
19	A	3	1	19
20	A	3	1	20
21	D	3	1	21
22	B	3	1	22
23	B	3	1	11
24	A	3	3	4
25	D	3	2	2
26	C	3	2	3
27	B	3	2	3
28	A	3	2	4
29	D	3	2	4
30	A	3	2	5
31	D	3	2	5
32	B	3	2	6
33	D	3	2	1
34	D	3	2	8
35	D	3	2	8

To consider yourself competent in this module (for Areas 1 and 2), you should not have made more than three errors.

Pre-Test for Area 3 (Operation of Wollensak 1520 Tape Recorder)

SET UP

1. Plug in microphone
2. Switch automatic cutoff lever to threading
3. Attach reels to thread tape

OPERATE

1. Adjust microphone distance using VL meter and voice
2. Record your own voice on recorder
3. Operate "Play"
4. Adjust tone controls
5. Operate "Stop" control
6. Operate fast, forward and rewind controls

TAKE-DOWN

1. Rewind tape correctly and remove reels
2. Turn off recorder

QUESTIONS

1. How would you find a specific point on the tape?
2. How would you change recording speed and why?

Pre-Test for Area 3
(Operation of Sony 104A Reel-to-Reel Tape Recorder)

SET UP

1. Plug in microphone and turn machine on
2. Attach reels and thread tape
3. Set index (footage) counter

OPERATE

1. Place automatic level control on "Manual" position
2. Record your own voice on recorder
3. Rewind and listen to your voice
4. Adjust tone controls
5. Operate "Fast Forward" control
6. Operate "Stop" control

TAKE-DOWN

1. Rewind tape correctly and remove reels
2. Turn off recorder

Pre-Test for Area 3
(Operation of Wollensak 2520 Cassette Tape Recorder)

SET UP

1. Plug in microphone
2. Place cassette into machine
3. Rewind tape to beginning, if not already at the beginning
4. Set index counter to zero

OPERATE

1. Adjust volume control
2. Place automatic level control so that it is not operative
3. Record your voice
4. Adjust volume control according to the recording level meter (or VU meter)
5. Operate "Stop" control
6. Operate fast, forward and rewind controls

TAKE-DOWN

1. Rewind tape and remove it from machine
2. Turn off recorder

QUESTIONS

1. How would you find a specific point on the tape?
2. How would you adjust the "tone" of the recording?

Pre-Test for Area 3
(Special Techniques in Tape Recorder Operation)

1. Erasing an audio tape using a tape recorder
   - A. Set up recorder for normal recording
   - B. Adjust volume, ALC, and microphone for tape erasing
   - C. Record silence
   - D. Rewind and listen to tape to see that it erased

2. Splicing an audio tape using scissors method
   - A. Set up tape to be spliced and make cut
   - B. Place tape ends together and splice
   - C. Burnish tape
   - D. Trim tape

3. Hooking up mulitple headsets to recorder using phone splitter
   - A. Connect headsets
   - B. Connect phone splitter to tape recorder

4. Duplicating an audio tape by going from one recorder to another
   - A. Set up tape recorders for normal recording
   - B. Connect the patch from one recorder to another
   - C. Set the volume for the "output" recorder
   - D. Record a portion of the tape to be copied
   - E. Play back duplicated tape to see that the copy was successful

Area 3--Behavioral Objectives for Operating the Wollensak 1520 Reel-to-Reel Tape Recorder

1. Given directions to set up the tape recorder for recording or playback, the learner will:

   A. remove cover, microphone, cords, etc., from case
   B. connect power cord first to machine, second to wall receptacle
   C. plug in microphone
   D. plug in extension speakers or head phones (if they are to be used)
   E. place automatic cut-off lever at "threading"
   F. thread tape from feed reels, through head slot, auto take-up reels (dull side toward heads).
   G. set record-playback speed 3-3/4 ips for voice, 7-1/2 ips for music
   H. set index (footage) counter

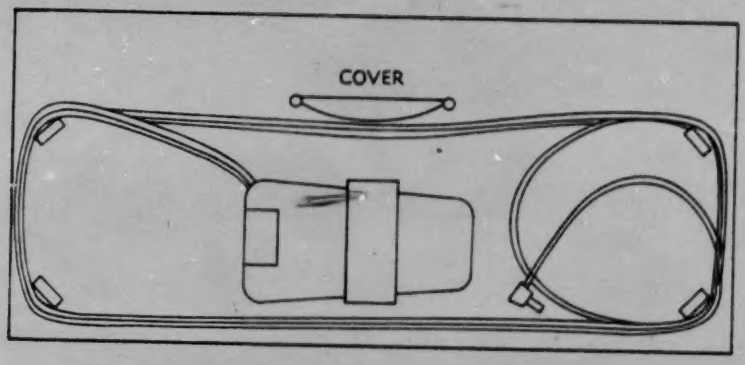
2. Given directions to operate the tape recorder by recording and then playing back, the learner will:

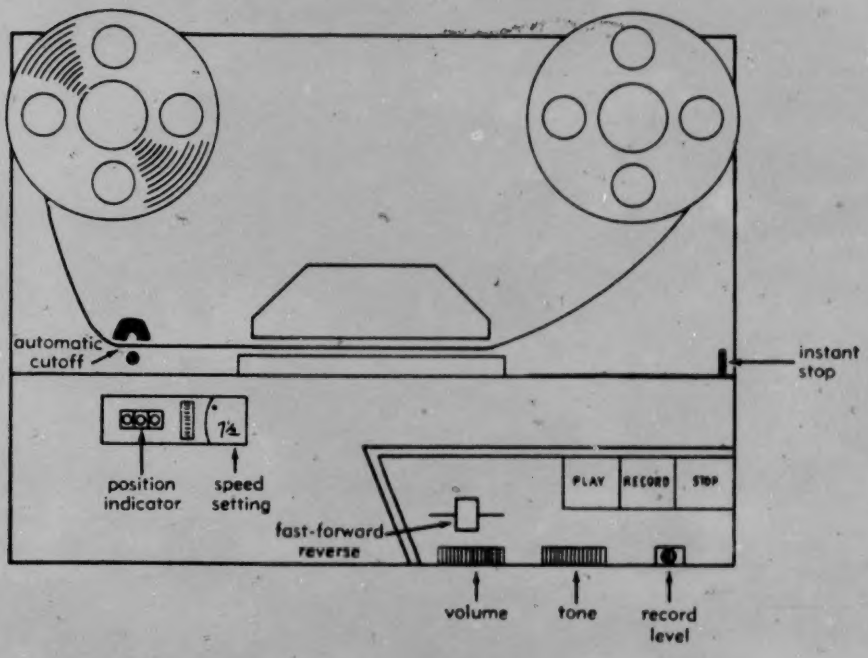
   A. depress record interlock
   B. depress record button
   C. hold microphone approximately 6 inches from mouth
   D. adjust gain (volume) control so VU meter needle averages between black and red zones
   E. depress stop button
   F. operate rewind lever
   G. operate fast forward
   H. depress play button
   I. adjust volume control to acceptable level
   J. adjust tone control to acceptable setting

3. Given directions to take down (disassemble or put away) the tape recorder for storage, the learner will:

   A. rewind tapes and remove reels
   B. return controls to "normal" or "off" positions
   C. remove cords, connections, and coil cords
   D. replace cover, place microphone and cords in case, etc.

Illustration (with components labeled)
of the Wollensak 1520 Reel-to-Reel Tape Recorder





Area 3--Behavioral Objectives for Operating the Sony 104A reel-to-reel Tape Recorder

1. Given directions to set up the tape recorder for recording or playback, the learner will:

   A. remove cover and power cord and microphone from bottom storage compartment
   B. connect power cord to power receptacle
   C. plug in microphone
   D. plug in headphones or extension speakers (if they are to be used)
   E. place feed and take up reels on machine and thread tape from feed reel through tape heads to take up reel
   F. set tape speed at 7-1/2 ips for music, 3-3/4 ips for voice, or 1-7/8 ips for voice at some sacrifice in sound quality
   G. set index (footage) counter at zero

2. Given directions to operate the tape recorder by recording and then playing back, the learner will:

   A. turn power switch on
   B. if ALC (Automatic Level Control) is to be used, place switch in "Auto" position. If ALC is not being used, place switch in "Manual" position
   C. depress "record" button and while holding down turn control to play (▶) position. (You are now recording.
   D. if ALC is not used, adjust the volume control according to the recording level meter

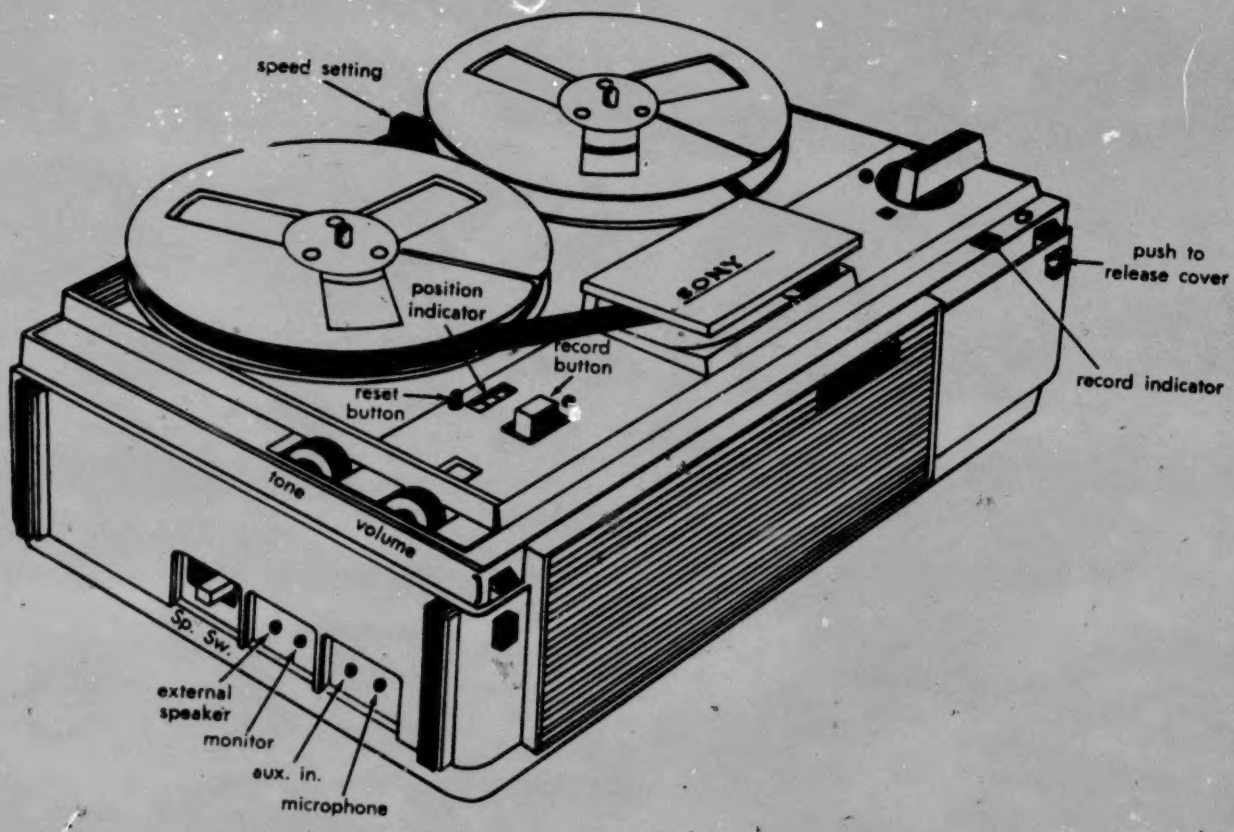
   --at the conclusion of recording--

   E. move control to "stop" (■) position
   F. move control to rewind (◀◀) position
   G. operate fast forward (▶▶) as required
   H. move control to play (▶) position
   I. adjust volume to an acceptable level
   J. adjust tone to an acceptable level

3. Given directions to take down (disassemble or put away) the tape recorder for storage, the learner will:

   A. rewind tapes and remove reels
   B. return controls to normal or off position
   C. disconnect microphone, speaker, headset, and power plugs
   D. coil cords and store
   E. replace cover

Illustration (with components labeled)
of the Sony 104A Reel-to-Reel Tape Recorder



Area 3--Behavioral Objectives for Operating the Wollensak 2520 Cassette Tape Recorder

1. Given directions to set up the tape recorder for recording or playback, the learner will:

   A. remove cover, power cord, and microphone from the storage compartment
   B. connect power cord to power receptacle
   C. plug in microphone
   D. plug in headphones or extension speakers (if they are to be used)
   E. place cassette into machine. Make sure appropriate side is up.
   F. turn on power switch
   G. rewind tape to beginning using "rewind" lever if it is not already at the beginning
   H. set index (footage) counter to zero

2. Given directions to operate the tape recorder by recording and then playing back, the learner will:

   A. turn volume to a mid-position
   B. if ALC (called "record mode" on this machine) is to be used, place switch in "auto" position. If ALC is not to be used, place switch on "Norm" position.
   C. depress "record" button and while holding down depress "play" button. (You are now recording)
   D. if the ALC is not being used, adjust the volume control according to the recording level meter (also called Volume Units or VU meter)

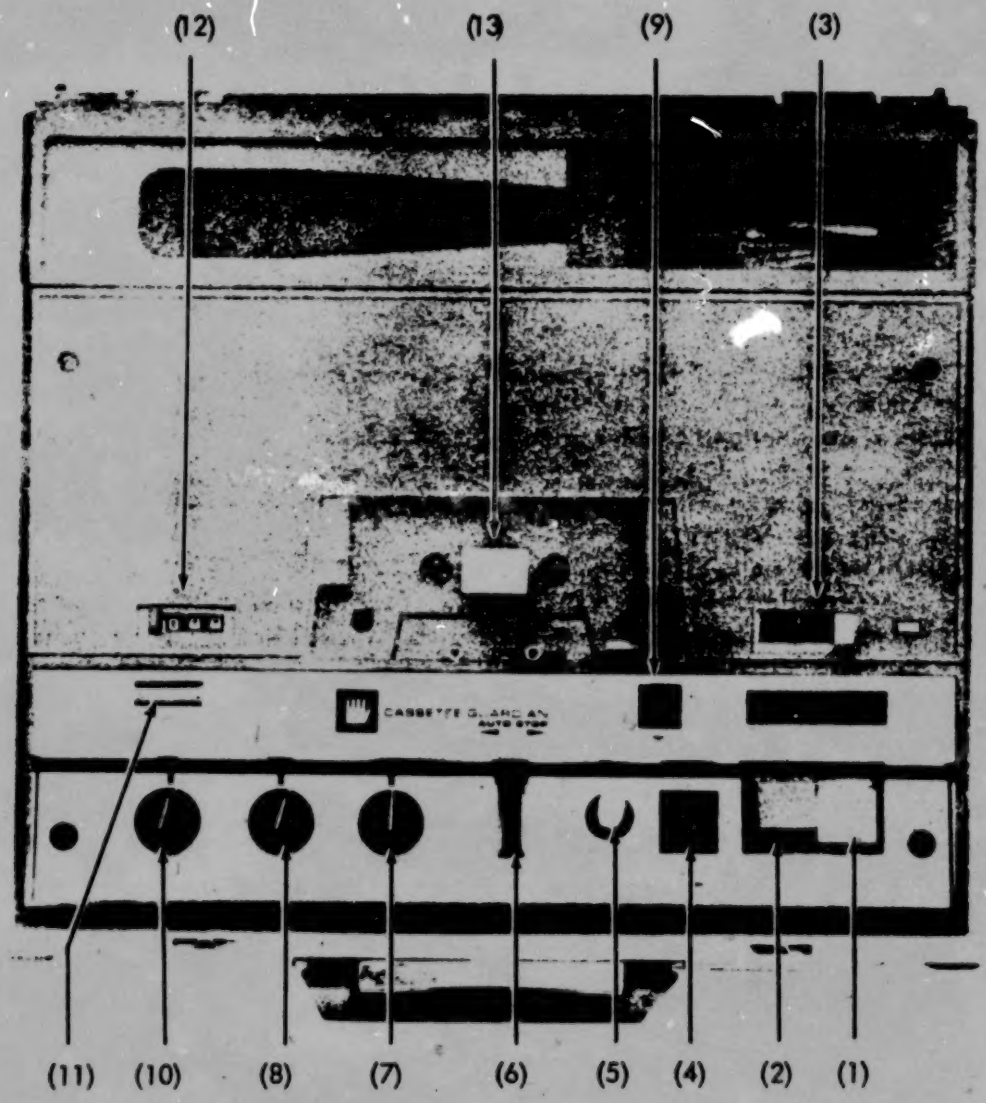
   --at the conclusion of the recording--

   E. push the "stop" button
   F. rewind tape by moving level to "rewind" position. Hold lever at rewind until index reads zero.
   G. operate "forward" as required to get tape at zero
   H. depress "play" button
   I. adjust "volume" to an acceptable level
   J. adjust "tone" to an acceptable level

3. Given directions to take down (disassemble) the tape recorder for storage, the learner will:

   A. rewind cassette to beginning
   B. remove cassette using "eject" button
   C. return controls to normal or off positions
   D. disconnect microphone, speaker, headset, and power plugs.
   E. coil cords and store in case compartment
   F. replace cover

Illustration (with components labeled)
of the Wollensak 2520 Cassette Tape Recorder



1. Play button
2. Stop button
3. On-off button
4. Pause control
5. Record interlock button
6. High speed forward and reverse lever
7. Tone control
8. Normal/automatic recording level control
9. Eject lever
10. Volume control
11. Recording level (VU) meter
12. Index counter and reset button
13. Cassette tape platform

Area 3--Behavioral Objectives for Special Techniques in Tape Recorder Operation

1. Given directions to erase an audio tape using a tape recorder the learner will:

   A. set up tape recorder as for normal recording
   B. locate portion of tape to be erased. If complete reel is to be erased, make sure tape is completely rewound before starting.
   C. unplug microphone, patch cords, or other inputs
   D. place recording volume on lowest setting. (Make sure ALC is switched to "off" or "manual".)
   E. depress record interlock and play button to record silence
   F. rewind tape, set volume to higher level, and listen to tape to make sure it has erased

2. Given directions to splice an audio tape, the learner will:

   A. overlap tape ends to be spliced 1/2" to 1"
   B. using sharp scissors, make a diagonal cut through both layers of tape at the same time. Discard the short ends.
   C. match the ends together without any gap between the ends. Also make sure the tape stays straight
   D. place a 1/2" to 1" length of splicing tape (use no other kind of tape) to the diagonal cut on the shiny side of the tape
   E. smooth down the tape to assure a good seal
   F. trim the edges to the tape in a shallow crescent.

3. Given directions to hook up a multiple headset (or earphone) listening station plus tape recorder, patch cords, headsets, and junction boxes, the learner will:

   A. connect all headsets to the junction box jacks marked "output" or "headphones"
   B. connect a patch cord to the junction box jack marked "input" or "tape recorder"
   C. connect the other end of the patch cord to the tape recorded jack marked "external speaker" or "headphone"
   D. play the recorder and adjust the volume and tone controls as necessary
   E. check each headphone to make sure it is working

4. Given directions to duplicate an audio tape through a tape recorder to tape recorder patch, the learner will:

   A. determine which tape recorder is going to be patched into which other tape recorder. (Remember: you can record either way--reel to cassette or cassette to reel.)
   B. identify the "input" connection on the second tape recorder. (Usually it is marked "Radio-Phono")
   C. identify the "output" connection on the first tape recorder producing the signal. (This may be marked "accessory amplifier," "external speaker," "monitor," "headphones," etc.)
   D. determine the type of patch cord needed to connect output to the input, and connect both machines with this patch cord
   E. play the "output machine" at a low volume
   F. make several trial recordings at various tone and volume settings to establish the volume and tone settings. (You may want to write these down for future reference)
   G. return tapes to beginning and make recording
   H. check duplicated tape by playing back to make sure it is acceptable quality recording

MODULE #3--MOTION PICTURE PROJECTION

Introduction

When "media" is mentioned it almost always provokes thoughts about television and motion pictures. The motion picture projector is perhaps the one outstanding example of traditional educational media. But television, a relative newcomer when compared with motion pictures, has already in its short life made a tremendous impact upon instruction and media usage. And now, with the invention of the cartridge television, it promises even greater use and impact.

This module on motion picture projection is designed to provide basic information on the characteristics and use of 16mm motion picture projectors, 8mm motion picture projectors, and television in instruction. It also provides basic instruction on the use and operation of 16mm motion picture projectors and the video-tape recorder. The procedures below have been developed to help you achieve these competencies.

Recommended Procedure You Should Follow

1. Note the Areas below and where various aspects of them are located in this MODULE:

Areas	Behavioral Objective	Type of Instruction	How Tested
1. Introduction to Motion Picture Projection	p. 143	Audio-slide (SISC) 341-0180 or Packet #9	Test
2. Motion Picture Projection--Including projection lens and screens	p. 149	Monograph (p. 153)	Test
3. Projection Operation:			
A. Kodak Pageant 16mm projection	p. 179	Audio-slide (SISC) 301-0176 or Packet #10	Check-out
B. Bell & Howell 552 Auto-load 16mm projector	p. 185	Audio-slide (SISC) 301-0181 or Packet #11	Check-out
C. Sony AV3600 Video Tape equipment	p. 191	Audio-slide (SISC) 533T-0163 or Packet #12	Check-out

2. Take the Pre-test which begins on p. 137 to determine what you already know about Area #1 and 2 above. Use the key following the test (p. 142) to see how you fared.

3. If the Pre-test reveals that you need additional study in Areas 1 and 2, study the Behavioral Objectives for those areas which begin on p. 143 and work through the instruction that is offered (monograph which begins on p. 153 of this MODULE and then Instructional Packet #9 or come to the Self-Instruction Systems Center and work through set #301-0180. Note the "involvement form" which goes with #301-0180 and which begins on pg. 147. This will help you to direct your attention and note taking. Note that space has been provided after each behavioral objective so that you can take notes while studying the instruction.

4. To see how well you are prepared in Areas 1 and 2 after instruction, take the Post-test for Areas 1 and 2 which begins on p. 169. Note the objective numbers which proceed the correct answer on the answer key following the Post-test. They will refer you directly to objectives with which you still may be having trouble.

5. Look at the Pre-test for Area 3 beginning on p. 175 and includes operating the Kodak Pageant 16mm projector, the Bell and Howell 552 Autoload 16mm projector, and the Sony AV3600 video-tape equipment. Can you do these things? If so, fine, you can successfully check out. If you can't do some or all of them, study the Behavioral Objectives for Area 3 which begin on p. 179 and work through Instructional Packets #10, 11 and 12 or come to the Self Instructional Systems Center and work through sets #301-0176, 301-0181, and 533T-0163. After this instruction, you should have no trouble checking out.

Selected Readings

	Pages
Wittich, Walter Arno and Charles Francis Schuller, Instructional Technology: Its Nature and Use, 5th Edition, Harper and Row, 1973.	447-550
Gerlach, Vernon S. and Donald P. Ely, A Systematic Approach, Prentice-Hall, 1971.	344-353 385-391
Dale, Edgar, Audiovisual Methods in Teaching, 3rd Edition, Dryden Press, 1969.	349-428
Brown, James W., Richard B. Lewis and Fred F. Harcleroad, AV Instruction: Technology Media and Methods, 4th Edition, McGraw-Hill, 1973.	179-206 237-262 488-497

Pre-Test for Areas 1 and 2

Directions: Circle the letter of the correct answer below.

1. Which of the following is not characteristic of 16mm motion picture projection:

   A. 16mm is usually projected reel to reel
   B. 16mm sound films are generally optical sound
   C. 16mm film can record real life actions through documentary
   D. 16mm film is appropriate for individual study

2. Which of the following is not an advantage of 16mm projection:

   A. 16mm motion pictures have a high audience interest
   B. many 16mm film titles are available for rent or purchase
   C. 16mm films cannot be economically produced by the amateur
   D. 16mm motion pictures are useful for demonstrating values and for developing attitudes

3. Which of the following is not a characteristic of super 8mm motion picture projection:

   A. Super 8mm films are usually sound films
   B. Super 8mm is appropriate for individuals
   C. Super 8mm films are available in cartridge form
   D. "single-concept" films are available

4. Which of the following is a characteristic of super 8mm motion picture projection:

   A. motion pictures can communicate abstract concepts
   B. Super 8mm films are more expensive than 16mm films
   C. Super 8mm projectors are difficult to operate
   D. motion picture films have low inherent interest

5. A disadvantage of super 8mm projection is that:

   A. super 8mm sound films are available in both magnetic and optical
   B. super 8mm films are appropriate for individuals and small groups
   C. cartridge films cannot be reversed for instant replay
   D. some super 8mm films are single-concept films

6. The approximate cost of a one to six minute commercially produced silent, super 8mm, color, cartridge film is about

   A. $4.00
   B. $6.00
   C. $10.00
   D. $30.00

7. What is the approximate cost of a 30 minute video-tape as would be used in a presentation setting when taping presenter behavior for critiquing purposes?

   A. $5.00
   B. $20.00
   C. $50.00
   D. $100.00

8. Which new development below will people make use of when video-taping (making tapes)?

   A. smaller and lighter equipment
   B. a new federal program to provide video-taping consultants for communities
   C. video-taping equipment which will cost less than $150
   D. all of the above
   E. none of the above

9. A disadvantage to group leaders when they are making a video tape is that:

   A. special lighting is needed
   B. sound must be added later
   C. equipment is very difficult to learn to operate
   D. all of the above are disadvantages
   E. none of the above are disadvantages

10. Which of the following is true concerning characteristics of television in the instructional setting:

    A. television shows can be "produced" by instructors
    B. television can be shown to large audiences
    C. television can show motion synchronized with sound
    D. all of the above
    E. none of the above

11. The motion picture format(s) used in instruction are:

    A. 8mm
    B. super 8
    C. 16mm
    D. A and C above
    E. B and C above

12. The <u>width</u> of 16mm film is

    A. 8mm
    B. 16mm
    C. 24mm
    D. 35mm

13. Super 8 film is most appropriate for

A. individualized study
B. group study

14. A special device for changing the size of the image on the screen is called:

A. an image intensifier
B. a lens rack
C. a focusing knob
D. a zoom lens
E. a lenticular screen

15. Generally the scratching of 16mm film as it is being run through a projector is due to:

A. a faulty (malfunctioning) projector
B. improper threading
C. a dirty film gate
D. poor sprocket alignment
E. cheap film stock

16. A jumpy and blurred picture on a motion picture projector is caused by:

A. poor focus
B. poor framing
C. film wound too loosely on feed reel
D. improper loop size
E. the nature of all automatic threading projectors

17. Motion picture projection is useful for:

A. showing motion
B. recording actual events
C. maintaining audience interest
D. all of the above
E. A and B above

18. When cost is not a consideration, the projection screen which should be used when the room is bright and cannot be darkened is a:

A. matte type
B. beaded type
C. lenticular type

19. A keystone distortion which produces an image which is broader at the top than it is at the bottom can be corrected by:

A. tilting the top of the screen forward
B. tilting the bottom of the screen forward
C. moving the whole screen closer to the projector
D. moving the whole screen further from the projector

20. Which of the following would be desirable characteristics of a projection screen?

A. low brightness and narrow reflectance angle
B. high brightness and wide reflectance angle
C. low brightness and wide reflectance angle
D. high brightness and narrow reflectance angle

21. The closest and farthest comfortable viewing distances from an 8 foot screen should be:

A. closest, 8 feet; farthest, 32 feet
B. closest, 16 feet; farthest, 32 feet
C. closest, 16 feet; farthest, 48 feet
D. closest, 32 feet, farthest, 64 feet

22. Your supervisor has been working with you to select film or video tape equipment which will be placed permanently in a very large room. The equipment will be used to show films from film rental agencies in your state. Which medium below would you choose?

A. 16mm projectors
B. super 8mm projectors
C. filmstrip projectors
D. video tape projectors

23. You are an instructor and you have access to all motion picture equipment as well as video equipment. Which medium below should you use if you wanted to keep what you filmed or recorded, wanted the lowest cost, and didn't want to project the finished result until a few months after you made it.

A. 16mm
B. super 8mm
C. video tape

24. You are teaching a group of nurses and you want to make a motion picture or video tape showing a doctor treating a patient for a cut. If you had no motion picture or video tape camera equipment to start with, what would be the least expensive route in terms of buying equipment to make the motion picture or the video tape?

A. buy 16mm film equipment
B. buy video tape equipment
C. buy super 8mm equipment

Pre-Test Key

Question Number	Correct Response	Module Number	Area Number	Behavioral Objective#
1	D	4	2	2,3,4
2	C	4	2	2,3
3	A	4	2	4
4	A	4	2	2,3,4
5	C	4	2	4
6	D	4	2	4
7	B	4	2	5
8	A	4	2	5
9	E	4	2	5
10	D	4	2	5
11	E	4	1	1
			2	2
12	B	4	1	2
			2	2
13	A	4	1	3
			2	4
14	D	4	1	4
			2	8
15	C	4	1	5
16	D	4	1	6
17	D	4	2	1
18	C	4	2	7
19	A	4	2	7
20	B	4	2	7
21	C	4	2	7
22	A	4	2	6
23	B	4	2	6
24	C	4	2	6

To consider yourself competent in this area, you should not have made more than two errors.

Area 1--Introduction to Motion Picture Projection--Behavioral Orjectives

1. The learner will list Super 8mm and 16mm as the two types of motion picture formats used in education.

2. The learner will identify the 16mm designation in 16mm motion picture film as the width of the film.

3. The learner will identify Super 8mm motion picture film as the most appropriate motion picture film for individualized instruction.

4. The learner will describe the function of the zoom lens as a lens which permits changing the image size.

5. The learner will identify cleaning the projector aperture and film gate to prevent film from getting scratched.

6. The learner will identify the cause of a blurred and jumpy picture as the result of an inadequate film loop.

Student Involvement Form

Principles of Motion Picture Projection

1. What are the two types of motion picture projectors commonly in use in Education?_____
_____

2. Which one of the above projectors is commonly cartridge loaded?_____

3. What does the designation 16mm refer to in this context?____
_____

4. Which format is the least expensive to use?_____
_____

5. Which format would you choose for individualized study?_____
_____

6. The motion picture sound projector is made up of a _____ _____section and a_____section.

7. Place a "P" in the blank in front of each item below that is part of the picture section of a movie projector. Similarly place an "S" in the blank in front of each item that is a member of the sound section.

____	a) projection lens	____	f) exciter lamp
____	b) condenser lens	____	g) sound lens
____	c) projection lamp	____	h) photo cell
____	d) shutter	____	i) amplifier
____	e) shuttle	____	j) speaker

8. Check the items listed below that move the film through the projector.

____a) shutter
____b) sprocket wheels
____c) projections lens
____d) shuttle
____e) photo cell

9. The film must move smoothly and continuously through the _____section of the projector.

10. The sound is recorded on the_____ of the film.

11. The "silent" speed of the motion picture projector is _____ _____ frames per second, while the "sound" speed is _____ frames per second.

12. The sound is recorded _____ frames ahead of the picture on 16 mm sound film.

13. If the sound is out of synchronization with the picture, the _____ film loop is not the correct size.

14. The persistence of the _____ makes possible the illusion of motion produced by flashing several still pictures on the screen in rapid succession.

15. To adjust the projected picture size, move the _____ _____ closer to or farther away from the _____ _____.

16. If the projector is equiped with a _____ you can vary the picture size by adjusting it.

17. To focus the picture, adjust the _____.

18. To obtain only one complete picture on the screen at a time, adjust the _____.

19. The people in the front row should be approximately _____ _____ from the screen.

20. To assure a sharp, brilliant picture, the lens should be cleaned with _____ when needed.

21. Teachers should _____ and _____ films to assure their appropriateness and usefulness.

22. To prevent the film from being scratched, the _____ and _____ should be cleaned regularly.

23. A three reel sound film is _____ feet long and requires _____ _____ minutes to show.

24. Improper film loop size can have the following effects.

    a) The picture will _____ and _____.
    b) Sound will be _____.
    c) The picture and sound will _____.
    d) Film will be _____.

25. If a film breaks, one should not _____.

CENTRAL MICHIGAN UNIVERSITY

Preview Card Name_____

Title_____ Date_____

Type of Material: Motion Picture_____Filmstrip_____

Tape recording_____Disc Recording_____Other_____

Length_____Rental_____Purchase_____Free_____

Copyright date_____

Producer_____Source_____

Recommended level of use: Elementary_____Jr. High_____Sr. High_____

College_____Adult_____

Photography: Excellent_____Good_____Poor_____

Sound: Excellent_____Good_____Poor_____

This material (is) (is not) applicable to my teaching. If it is, indicate in what way:

SUMMARY:

COMMENTS:

Area 2--Motion Picture Projection- Including Projection Lens and Screens

Behavioral Objectives

1. The student will be able to identify statements which describe three unique advantages to motion pictures and television.

   A.

   B.

   C.

2. The student will be able to identify statements which describe five characteristics of both 16mm and Super 8mm which make them useful for instruction.

   A.

   B.

   C.

   D.

   E.

3. The student will be able to identify statements which describe five characteristics unique to 16mm projection which make this medium useful for instruction.

   A.

   B.

   C.

   D.

   E.

4. The student will be able to identify statements which describe six characteristics unique to Super 8mm projection which make this medium useful for instruction.

   A.

   B.

   C.

   D.

   E.

   F.

5. The student will be able to identify statements which describe seven characteristics of television which make this medium useful for instruction.

   A.

   B.

   C.

   D.

   E.

   F.

   G.

6. Given hypothetical learning situations, the student will be able to identify the appropriate motion picture format (16mm, Super 8mm, or television) or projector screen which most matches the requirement of the learning situation.

7. The student will be able to identify statements which describe the types of projection screens (2), the types of front projector screens (3), and the rules (3) for correct front projector screen usage.

8. The student will be able to identify statements which describe the two basic lens options that purchases of projection equipment have.

A.

B.

Area 2--Motion Picture Projection--
Including Projection Screens and Lens--Monograph

When people think of media for instructional purposes, they automatically think of motion pictures. And why not? Ever since 1894 when Thomas Edison invented the motion picture projector, the American public has had a love affair with the "flickers" and the people who make them. Educational motion pictures have been used in the schools since 1924 when George Eastman of Kodak developed 16mm film size to replace the twice-as-cumbersome 35mm size. With such a head start on other forms of media used for instruction (with the exception of lantern slides and printed media), it is little wonder that motion pictures are, or at least have been, the most used of non-print media in instructional settings.

When we think of motion pictures used for instruction, we are considering three types:

1. 16mm film
2. Super 8mm (developed in 1966 to replace regular 8mm)
3. Television (relatively new)

Both 16mm and super 8mm films are simply long strips of cellulose acetate stock containing a sequence of still photographs, each of which is called a frame. These frames, while projected individually on the screen, are flashed on very quickly--16 frames each second for silent film and 24 frames each second (18 frames per second for super 8mm) for sound films. Because these frames flash on the screen in sequence at a rate of at least 16 frames per second, the eye is unable to keep pace and interprets the individual frames as a flow of motion. Because each image persists in the mind for a small fraction of time after the source has disappeared, the eye and mind receive an impression of motion. Television, on the other hand, works like a tape recorder, in that motion is recorded (as well as sound) on a continually moving tape.

When taken together, these three types of motion pictures have three really unique advantages for instruction. The most obvious is that they can show motion, and as any instructor would attest, some concepts need motion in order to be learned effectively. To demonstrate certain job skills, for example, would require motion. Motion pictures depicting or recording actual happenings, called documentaries, are another really unique possibility with motion pictures. Also, and this is not usually thought of, but motion pictures have a very high inherent interest for viewers.

Learners of any age are already confirmed film and TV watchers. In fact, it is sometimes somewhat difficult to get learners to look at something that isn't in "living motion."

Later in this monograph we shall present specialized characteristics and advantages and disadvantages of television as used for instructional purposes. Now we will consider 16mm and super 8mm film.

16mm and Super 8mm Projection

Five specialized characteristics of both 16mm and super 8mm motion picture film make them useful for instruction:

1. They can compress time sequence through time lapse photography. This is done simply by taking a single exposure shot every so often and then running the film through the projector at the normal rate. It is possible to see such things as flowers opening, or any other type of development that takes a long period of time. These can be compressed and shown in a short period of time permitting the viewer to watch the total sequence of events more quickly than they occur in real life.

2. They can enlarge and project the microworld. This is similar to shooting film through a special microscope. This process is called microphotography.

3. The use of film permits the development of a central theme through a build up of rapidly projected sequential themes. This is called a "montage." This has been seen most effectively in the television production of "Laugh-In", in which they showed scenes very quickly and let those scenes build up some kind of story. This is a very interesting use of film.

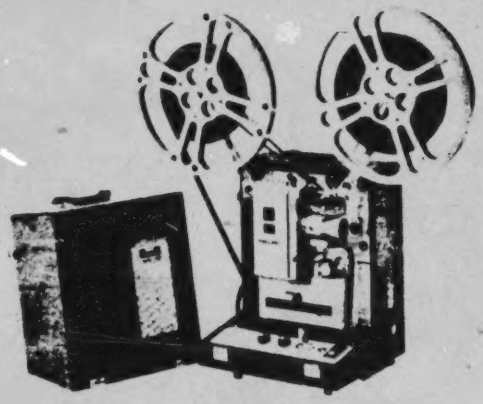
4. Film is very good for simulating real life actions. Because of this it is one of the best ways for changing attitudes and demonstrating values. In fact, other than simulation games, it is the most effective means we have to work in the affective realm (feelings, emotions, attitudes, etc.).

5. You can communicate abstract relationships on film that would be very difficult to communicate to people otherwise. For example, you can do animation (shooting one shot at a time, then projecting the shots in a motion picture projector). It is impossible to see with the naked eye how various parts of the human body work but through the use of animation these processes can become very vivid.

When considering characteristics unique to 16mm motion picture film alone, we also can enumerate five. They are:

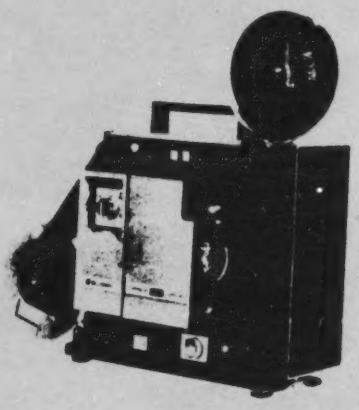
1. Because of the larger film size and bulky projectors, 16mm projection is most suitable for large group instruction.

Kodak Pageant 16mm
Motion Picture Projector.
A popular manual-threading
projector.



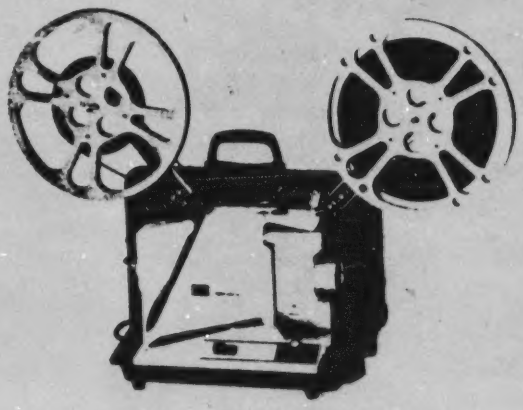
In fact, in a movie theater, the film is ordinarily 35mm wide (or in some cases, even 70mm wide), which of course is more than double the size of 16mm film. The wider the film is, the bigger the projected image. Sixteen mm film is about the optimum size motion picture film suitable to use in a normal room the size of a typical school classroom. For individualized instruction, 16mm film size requires too bulky a projector to be of really efficient use, its use would be like swatting a fly with a cannon.

Bell & Howell 1552 B Autoload
16mm Motion Picture Projector.
An entirely self-threading
projector.



2. Sixteen mm films have very high quality sound and most are in color. The high quality sound is due largely to the fact that it is optical sound, that is, the sound is recorded optically right on the film. Consequently, the sound is of much better quality than that which is normally found on magnetic sound film--the type usually associated with super 8mm projection.

Singer Instaload 16mm Motion Picture Projector. A semi-self threading projector.



3. Thousands and thousands of titles are available in 16mm film. There are probably more individual titles (that is, different films) available in 16mm film than any other types of media. In fact, it has been estimated that up to thirty thousand different films are available. Usually films cost between $200 and $400 each (depending mostly in length) and can be rented for $15 to $20 apiece.

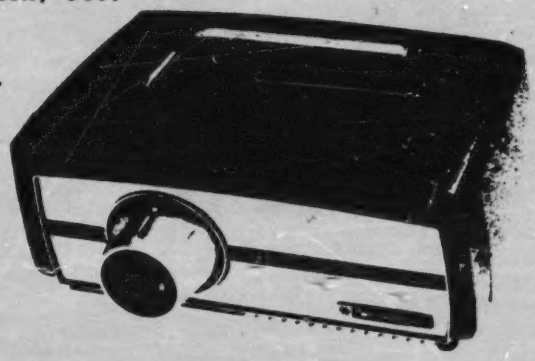
4. Because of the expense and complications involved, very seldom are 16mm films produced by amateurs. Almost all amateur film-making is "shot" on super 8mm film.

5. Sixteen mm film is one of the most expensive of all instructional media. The cost of a projector is about $800 and the software (films) cost between $200 and $400. It is ironic that with the high cost of 16mm projection equipment and films it remains one of the most popular types of media available. This is so in spite of the fact that it will do only one thing that other types of media will not do and that is show motion. Motion is expensive, isn't it!

There are six characteristics unique to super 8mm motion picture film.

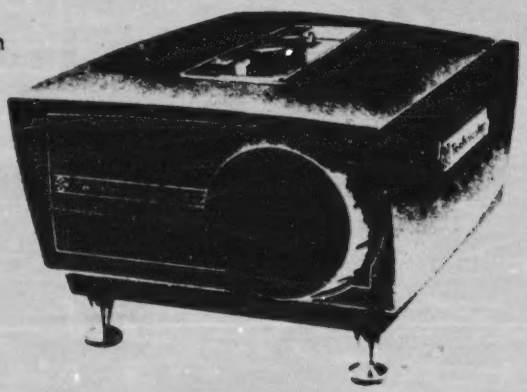
1. Super 8mm film is good for individual and small group use because the projectors are small and relatively easy to use. The film is half the size of 16mm, so the image is somewhat smaller and therefore lends itself to individual and small group use in study carrels and rear projection screens. Also, most of the Super 8mm films commercially available are designed to teach a single concept such as the proper technique to saw a board, mix a beaker of chemicals, sew a button, etc.

Technicolor 520 A Super 8mm Film Loop Projector (silent). A continuous loop self-threading single concept projector.



2. Super 8mm film, while it is usually in color, does not generally have sound. However, there is available a cartridge projector in Super 8mm which does feature high quality optical sound.

Technicolor 1000 Super 8mm Projector (sound). An optical sound continuous-loop self-threading projector

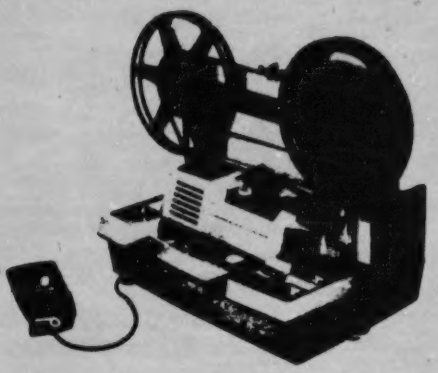


3. Thousands of titles are available for purchase and usually cost about $30 for 5-7 minutes of single-concept silent film. There aren't as many super 8mm films available as

16mm films, simply because super 8mm films are a much newer application of film than 16mm.

4. Super 8mm film can be produced easily, successfully and economically by the amateur. This means that most instructors will find it easy to produce on Super 8mm picture film. A 2 1/2 minute Super 8mm film can be produced for about $6, which includes the purchase cost of the film as well as the cost of the developing. A very good camera can be purchased for less than $100 and a projector can be bought for about the same price.

Kodak Ektagraphic MFS-8
Super 8mm Projector (silent).
A semi-self-threading reel-to-reel projector.

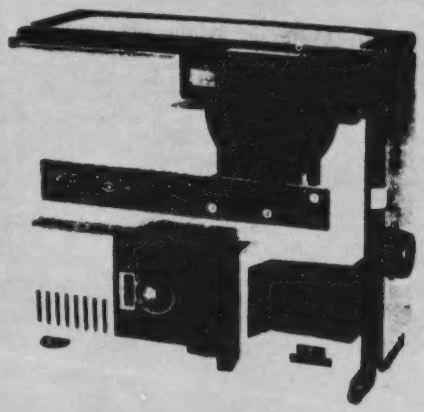


5. A magnetic sound track can be added to the film when it is being developed and when the film comes back you can add sound to the film. What you are doing, of course, is adding narration to the film. The magnetic sound is merely a very thin strip of tape fastened to the side of the film. It costs between 7¢ and 11¢ per foot to add this tape. To add sound in this way, you need a Super 8mm projector with a magnetic sound head built into it so that you can record sound while the film is being shown. Of course you would have to have the same type of projector in order to show the film with the sound added. Another way you can add sound to Super 8mm film is to record the narration you want on a cassette tape and then play the cassette at the same time you show the film. There is, however, some problem in starting the projector and the cassette player at the same time. Also keeping units synchronized once they are operating. Special equipment is available for controlling sound and picture synchronization.

6. Super 8mm film can be loaded into a cartridge, which greatly simplifies the threading of the film into the projector. However, while cartridges have a definite threading advantage, they also have a few disadvantages. Cartridges, at least with the Technicolor brand, which is the most popular, cannot be reversed for instant replay--you have to show the whole cartridge through to get to the spot you want to see again. In addition, because the film in the cartridge is in loop form, the user is likely to view a cartridge that has been left in the middle of a sequence rather than from the beginning. In other words, if you take a conventional reel-to-reel film and run it through a projector, it has a beginning and an end, but with an endless loop you have to start where someone else left off. Another problem is that after about a hundred showings cartridges begin to jam. This is because the film cannot be lubricated when it is sealed in the cartridge. Lack of lubrication, plus the sharp bends the film has to take because of the small rollers in the cartridge, causes the film to become brittle. The brittleness leads to jamming and it becomes quite a job to unjam the cartridge without ruining the film. When the film jams the projector operator must be very quick to shut the projector off or a hole will be burned right through the film.

Some of the newer reel-to-reel projectors, such as those that are available from Kodak, are almost as easy to operate as a cartridge projector. In other words, they operate very simply, with automatic take-up reels and automatic threading. We would recommend these over the regular cartridge film. While the cartridge film might be a little more convenient to use, the disadvantages outweigh the advantages.

Kodak Ektagraphic 120
Super 8mm Projector (silent)
A cartridge projector.

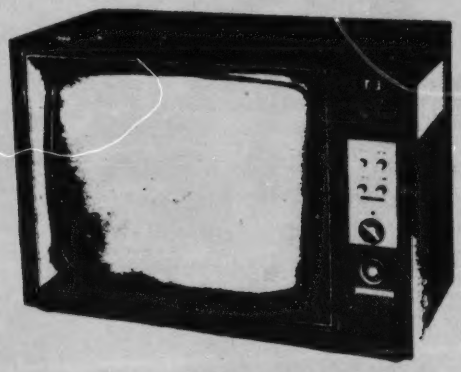


Television

The third type of motion picture is television. Television is one of the relative newcomers, both to the commercial scene and to instruction. Television really didn't come into its own until after the Second World War, while motion pictures were used much earlier. Even so, most school districts and many business and governmental units now have at least one television camera, tape deck, and monitor. And of course almost all people have access to commercial and Public Broadcasting Network TV. Instructors have two kinds of television available to them: professionally prepared television that can be seen on commercial or the Public Broadcasting Network and videotapes which are, for the most part, instructor or student-prepared. These are tapes that are produced by utilizing a TV monitor (set), a camera, and a recorder (tape deck).

The three basic components of a video-taping unit:

1) The Monitor



2) The Tape Deck

3) Camera with zoom lens on a tripod

We might add that a video tape recorder is very similar to a tape recorder. It works very much the same way and in fact the tape looks just like audio tape except that it is wider. Most video tape used in instruction or for presentations is 1/2" wide, although many of the new video cartridges use 3/4" tape.

There are seven characteristics of television for instructional purposes.

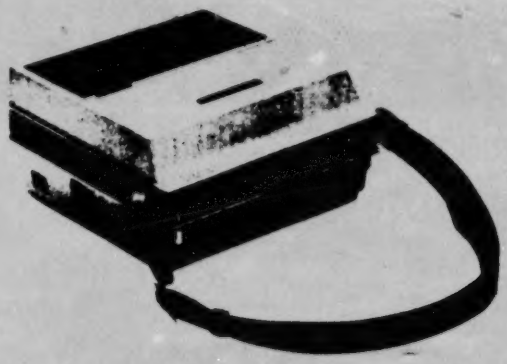
1. You can show television to a small group by having them look at one monitor. However, if you are going to show the same program to a very large group, you will need a number of monitors (TV sets) placed around a room. Another way to do this would be to use a video projection device (a very expensive proposition) which projects the video picture onto a large screen.

2. Making a video tape is very similar to making an audio tape. In most cases, special light is not a necessity; in ordinary rooms you can make a very acceptable video tape which will include the visual element and sound because you pick up the sound at the same time you make the tape.

3. Video taping is very good for critiquing because it offers the feature of immediate feedback. No development time is needed. You can see where this would be valuable, e.g., in athletics, in sales presentations, or in nursing techniques, anyplace where a person needed to perform and then immediately play back the results for self-criticizing purposes. In fact, it is often used by instructors themselves when they want to assess their own presentation skills.

4. Television is the most inexpensive way to achieve motion. It costs practically nothing if the image is not to be preserved because video tapes are erasable just as audio tapes are erasable and hence can be used over and over. However, it should be mentioned that the purchase cost of the original equipment is quite expensive--about $2,000 for a complete set-up. Too, a half-hour of video tape costs approximately $20.

5. Portable, battery-powered video tape units are available.

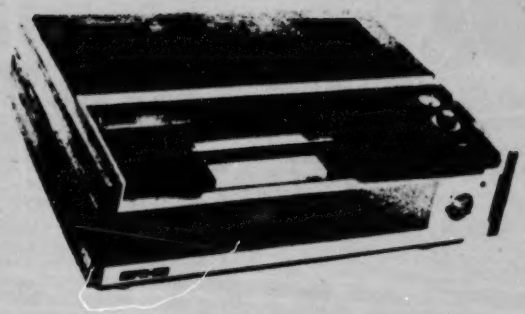


Sony AV-8400 video tape recorder. A portable battery-powered recorder. Weighs 18 lbs.

This is "go anywhere" type of equipment that can be carried, strapped around your shoulder, and with it you can literally go anywhere and do video taping for a limited period of time (usually one-half hour or less before the battery needs charging). When we say these are portable we don't mean that they are featherweight, but for a short time they are not uncomfortable. Break throughs are continuing to be made in portable video taping equipment and both the size and weight are steadily going down. No doubt we will eventually have video tape recorders of about the same size as a very small cassette audio tape recorder.

6. Video cassettes are now available which make video tape as easy to use as audio tape cassettes. The video cassette system developed by Sony seems to be the most popular at the present time. With the Sony system you simply insert the cassette and the machine threads it automatically for you. This ease of use will help popularize TV for instructional purposes. It will also greatly affect the entertainment film industry because it will enable you to show first run movies in your home through a color TV set. Video discs made with a laser beam are about to be marketed which will bring down the cost even further.

JVC Color Video tape recorder. A cassette, automatic threading recorder.



Some people are saying that a feature length movie will be available for $5 or $10 on video discs.

7. Complete video-taping units (black and white) are available for about $2,000. By complete unit we mean a camera with a zoom lens and electronic viewfinder, a tape deck, a television set (called a monitor) and a tripod. While the initial cost is high, the expense of making a tape is not costly if you are not keeping the tape. However, most tapes run about $20 for a half-hour, so the cost can become considerable if tapes are to be preserved.

Some Instructional Ideas with Motion Pictures

1. Motion pictures on the same topic, but with different viewpoints, can be shown to invite discussion. Labor relations from the viewpoints of GM and UAW would certainly be different!

2. Motion pictures can be used to introduce a unit and build up interest.

3. Motion pictures can be used for evaluation purposes. You could show only part of an experiment and then ask students to finish it or describe the probable result. A social problem film could be shown but shut off just before any solution is given. The students could then supply their own solution.

4. Motion pictures (particularly TV) can be used to film sociodramas to be played back for discussion and evaluation.

5. Video taped instruction can be played while a student is standing in front of a piece of equipment learning to operate it.

6. Interview procedure can be very effectively taught when simulations are video taped.

7. Student-created television (VTR) and films can be a very effective learning experience.

8. TV can be used to record details on a field trip for later discussion.

9. Demonstrations of processes and procedures can be made visible to a whole class at once. Imagine a nurse when he or she is showing a class of 30 students how to clean a wound. Of course, it is impossible for the thirty people to get near enough to watch the instructor closely. The solution to the problem is to mount a camera over the instructor, thus providing each student with a "front-row" seat.

SUMMARY--MOTION PICTURE PROJECTION

You have now had a rather quick run through of the three forms of motion picture projection: (1) 16mm film, (2) super 8mm film, and (3) television. In summary, sound motion picture projection can communicate effectively without relying on reading skills, can permit the viewing of actions in motion which would be impossible or inconvenient for the human eye to see directly, can provide the continuity of action which only motion can do effectively and can re-create real or imagined events. On the other hand, these unique advantages are only achieved at considerable cost. The astute instructor must determine if the advantages of motion pictures justify the cost.

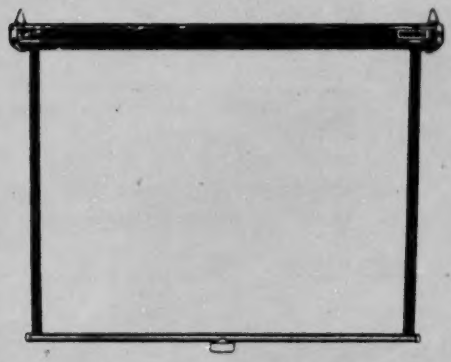
Projection Screens and Lenses

Projection Screens

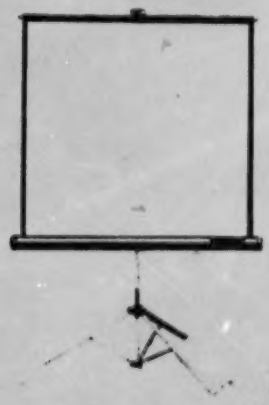
In all types of projection, the projection screen is an important element in the process. While there are many esoteric considerations to be made when considering screens, for the purpose of this course we are only going to consider the most important ones. It has been our experience that instructors are usually not involved in the selection of screens, though this is not to say that they should not have more say in this area.

There are two basic kinds of screens used for instructional purposes. One is the front projection screen that is usually mounted on a wall or a tripod.

Wall Mounted Front Projector Screen.

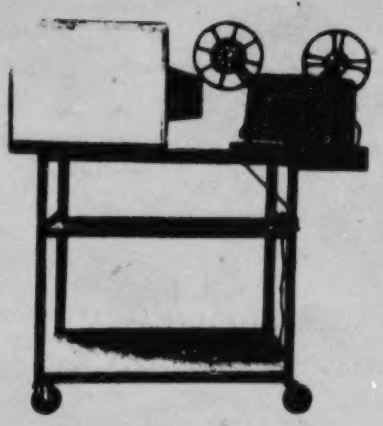


Front Projection Screen mounted on a Tripod.

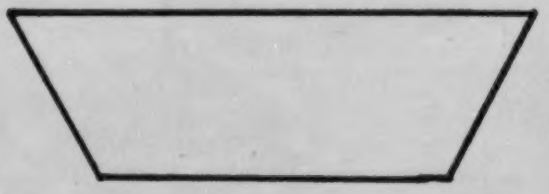


The other is newer to the instructional process--the rear projection screen which is actually a translucent panel in which the projector is mounted behind the screen. The front projection screen is usually used with larger groups (and is the type most often found in the typical room used for instructional purposes) while the rear projection screen is most often used by individuals or small groups.

Rear Projection Screen
Mounted on a Movable Cart.



The front projection screen should be at least 60" x 60" (the square shape to accommodate vertical slides, transparencies, and opaque projection materials) for a conventional classroom. The screen should be mounted high enough so that the lower horizontal edge is above the heads of seated students. It is a good idea to have the screen mounted in such a way that the top of the screen tilts a bit toward the audience. This will help prevent the "keystone" effect, most often noticed in overhead projection, where the picture image doesn't strike the screen "square" or at a 90° angle. This causes the image to appear lopsided, e.g.,



In addition to screen size and location, the media user has to consider the relative merits of matte (flat) surface screens, glass beaded screens, and the newest type, the so-called lenticular screen. Matte surface screens are the most inexpensive and diffuse light more widely than glass-beaded screens, but on the other hand, they do not reflect as much light as the beaded screen and hence require a darker room. The glass-beaded screen, though a little more expensive than the matte type, is the most popular for instructional use as it reflects more light than the matte screen. However, the viewing angle is narrower than for the matte screen. A fairly expensive compromise is the lenticular screen which is distinguishable by its silver color finish. This screen reflects as much as if not more light than the glass beaded screen and has a viewing angle about as wide as the matte finish screen.

Another consideration to be made when utilizing projection screens in instruction is the distance your audience should be from the screen to "see the action" effectively. A good rule of thumb is that people should not sit closer to the screen than two screen widths, nor farther from the screen than six screen widths. Therefore, if you have a screen that is 7' wide, your audience should be seated between 14' (2 x 7") and 42' (6 x 7') from the screen. Another good suggestion to keep in mind when using screens is to place the back of the screen toward any unwanted light. This helps to eliminate glare.

Lenses

Closely related to screen size is the lens length on projectors (filmstrips, slide, 16mm and super 8mm). Obviously, the total screen should be filled with a projected image. For instructional use most projectors are supplied with a lens suitable for a traditional room with a traditional size screen (60" x 70"). To get a larger or smaller picture size, the projector can be moved further away (for a larger picture) or closer to the screen. Another way to adjust the image size on the screen is to purchase optional lenses for your projection equipment. Usually you can get lenses ranging from of focal length of 2" to 6" which will allow you to get the projector as close as a foot or two from the screen (as in the case of a rear projection screen) or as far away from the screen as a large auditorium would require. The closer the projector to the screen, the shorter the focal length must be. Most media directors and camera shops have charts available to show you what lens you need for your particular application. A still more convenient and flexible way to change image size is to purchase your projector equipped with a zoom lens. The image size can be enlarged or made smaller simply by rotating a portion of the lens barrel (if you come to campus for your equipment training, you will discover that the 16mm projectors and the Carousel slide projector you will be learning to

operate have this feature). A special lens is required for using a projector with a rear projection screen. This is because the projector is located so close to the screen-usually not more than a foot or two away.

Post-Test for Areas 1 and 2

Directions: Circle the letter of the correct answer below.

1. One of the characteristics of 16mm motion picture projection is that:

   A. 16mm films are easy to store
   B. 16mm films are appropriate for individual study
   C. 16mm projectors are easy to operate
   D. motion pictures can develop a central theme through montage

2. Which of the following is not a characteristic of 16mm projection?

   A. 16mm motion pictures can communicate abstract relationships
   B. 16mm films and projectors are relatively expensive
   C. many 16mm films are available for free viewing
   D. 16mm films are available in both black and white or color

3. Which of the following techniques is not characteristic of super 8mm motion picture projection?

   A. photomicrography
   B. animation
   C. montage
   D. sixty minute reels

4. Which of the following is not an advantage of super 8mm motion picture projection?

   A. super 8mm films can be made by amateur photographers
   B. films are easy to store and retrieve
   C. few super 8mm films are sound films
   D. motion pictures are useful for developing attitudes

5. One of the disadvantages of super 8mm projection is that:

   A. super 8mm films are available in both black and white or color
   B. many titles are available for purchase
   C. motion pictures are adept at demonstrating values
   D. cartridge films are often left in the middle of the sequence and usually do not start at the beginning

6. The approximate cost of a 16mm, reel, sound projector is about:

   A. $110.00
   B. $400.00
   C. $700.00
   D. $950.00

7. Which new development below has the potential to add color to TV at a very low cost?

   A. Cable TV
   B. Smaller and lighter cameras and recording units
   C. Video-cassette systems
   D. All of the above
   E. None of the above

8. Let's say that you or the group you are instructing wants to add a visual component with motion and sound to a presentation. Which media equipment below would "do the job" with the most speed and lowest cost?

   A. super 8mm equipment
   B. video-tape equipment
   C. slides with a tape recorder
   D. overhead projector with records

9. The motion picture format not used extensively for instruction is:

   A. 8mm
   B. super 8mm
   C. 16mm

10. The "sixteen" in 16mm films is a measurement of

   A. film height
   B. image height
   C. film width
   D. image width
   E. none of the above

11. 16mm film is most appropriate for:

   A. group study
   B. individualized study
   C. both group and individualized study

12. The zoom lens on a 16mm projector makes it possible to:

A. use the 16mm projector for individualized study
B. increase or decrease the image size
C. focus the projector from a remote location
D. adjust the framing from a remote location
E. produce the effect of movement (moire effect)

13. A dirty film gate on a 16mm projector will cause:

A. the picture to jump
B. the film to be scratched
C. poor focus
D. failure of the automatic threading mechanism

14. Improper film loop in a motion picture projector is liable to:

A. cause the picture to be blurred and jumpy
B. damage the film
C. damage the projector
D. have no effect (this is normal operation)
E. decrease the sound level

15. Which one of the following is <u>not</u> true about motion picture projection?

A. Motion picture projection includes 16mm, super 8mm film, and video tape.
B. Motion pictures are very appropriate for recording real events
C. Motion pictures are considered "old hat" and dull by most audiences
D. Motion pictures are among the most "realistic" of all media

16. A keystone image distortion can be corrected by:

A. using a <u>longer</u> focal length lens
B. hanging the screen on the wall
C. tilting the screen
D. adjusting the elevation screw found on most projectors

17. The minimum and maximum comfortable viewing distances from a 5 foot wide screen would be:

A. minimum, 5 feet; maximum, 10 feet
B. minimum, 10 feet; maximum, 30 feet
C. minimum, 15 feet; maximum, 30 feet
D. minimum, 5 feet; maximum, 40 feet

18. For general use and considering cost, the beaded screen is considered to be:

A. the least desirable
B. the most desirable
C. the best compromise
D. the worst compromise

19. The projection screen which costs the least is the:

A. matte
B. beaded
C. lenticular

20. You are the director of a musical group and you want to film or video-tape your group as they are performing. You want to use this filmed or video-taped record to give the participants "instant feedback" as to how they are performing. What medium below would you choose?

A. visual cassettes
B. super 8mm film
C. 16mm film
D. video tape

21. You are working with a large group of salesmen--over 200--in a large auditorium and you want to show a film or video-tape on correct sales technique. The film or video tape has been commercially produced. Which medium below should you select?

A. 16mm
B. super 8mm
C. video tape

22. You are touring a factory with your class and you want to make a motion picture of what you see. You are not particularly concerned about keeping the film or tape you make after the instructional session is over. Assuming that you have access to video tape and motion picture camera equipment and you want to keep costs down, which medium below would you use?

A. video tape
B. 16mm film
C. super 8mm film

Post-Test Key

Question Number	Correct Response	Module Number	Area Number	Behavioral Objective#
1	D	4	2	2, 3, 4
2	B	4	2	2, 3
3	D	4	2	4
4	C	4	2	2, 3, 4
5	D	4	2	4
6	C	4	2	4
7	C	4	2	5
8	B	4	2	5
9	A	4	1	1
10	C	4	1	2
11	A	4	1	3
		4	2	3, 4
12	B	4	1	4
		4	2	8
13	B	4	1	5
14	A	4	1	6
15	C	4	2	1
16	C	4	2	7
17	B	4	2	7
18	C	4	2	7
19	A	4	2	7
20	D	4	2	6
21	A	4	2	6
22	A	4	2	6

To consider yourself competent in this area, you should not have made more than two errors.

Pre-Test for Area 3

(Operation of Kodak Pageant 16mm Projector)

SET UP

1. Raise reel arms and install belt
2. Install feed and take-up reels and thread film
3. Check for adequate loop
4. Locate speaker phones jack and plug in speaker
5. Place film-microphone switch on film
6. Turn on amplifier
7. Select sound-silent film speed
8. Adjust image size
9. Adjust elevation

OPERATE

1. Run film to check threading
2. Adjust volume and tone control
3. Run film forward, then backward
4. Operate loop restorer

TAKE DOWN

1. Turn off lamp, rewind film
2. Remove reels and take down arms
3. Rack lens in
4. Switch lamp and motor off
5. Lower elevation control

QUESTION

How would you change projector lamp and exciter bulb?

Pre-Test for Area 3

(Operation of Sony AV3600 Video Tape Equipment)

SET UP

1. Plug in microphone
2. Make cable connection from VTR to camera
3. Make cable connection from VTR to TV monitor
4. Thread tape on VTR

RECORD OFF CAMERA

Record a short segment that meets the following criteria:

1. Clearly focused video of good contrast and brightness
2. Absence of a horizontal roll or vertical bars
3. Contains audio
4. A zoom shot
5. A pan shot (side to side)

AUDIO DUB

Record new audio on to the tape that has just been recorded (leave the video undisturbed)

RECORDING OFF THE AIR

Record a short segment of a program broadcast over the air

TAKE DOWN

1. Turn off power for VT, TV monitor and camera
2. Disconnect microphone, VTR to camera connection and VTR to TV monitor connection

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3. Replace camera lens cover and tape from the VTR

4. Replace lid to the VTR unit

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Pre-Test for Area 3

(Operation of Bell & Howell 552 Autoload Projector)

SET UP

1. Turn on volume control
2. Locate speaker-phones jack
3. Raise reel arms and install reels
4. Turn lamp on and select sound or silent film speed
5. Adjust image size or use zoom lens
6. Adjust elevation

OPERATE

1. Focus image and frame picture
2. Run film forward, then backward
3. Adjust tone and volume controls
4. Operate "System Restorer" to eliminate picture flicker or mushy sound
5. Operate stop action (still) control
6. Switch lamp off and rewind film

TAKE DOWN

1. Remove reels and collapse reel arms
2. Rack lens in
3. Lower elevation
4. Switch off power

QUESTION

How would you change the projector lamp and exciter bulb?

Area 3--Behavioral Objectives for Operating the Kodak Pageant 16mm Projector

1. Given directions to set up the Kodak Pageant projector for projecting films, the learner will:

   A. Remove cover
   B. Remove cord from storage pocket and plug into power receptacle
   C. Raise front reel arm
   D. Raise rear reel arm and loop drive belt over pulley
   E. Uncoil speaker cord (or headphones) and plug into speaker jack
   F. Place "film-microphone" switch on film
   G. Set tone control to normal
   H. Set volume control to extreme counter-clockwise position
   I. Turn on amplifier by depressing "amplifier power" button
   J. Push "rewind" lever to up position
   K. Move "master control" lever to extreme right (Lamp) position
   L. Select film speed--"silent-sound" consistent with type of film being used
   M. Adjust projection distance (projector to screen distance)
   N. Adjust elevation
   O. Focus image
   P. Move "master control" to off position
   Q. Latch film gate in open position
   R. Place feed reel on front reel arm (sprockets must be on side nearest projector operator)
   S. Unwind about 4-5 feet of film
   T. Open upper sprocket clamp
   U. Loop film around upper sprocket, engage teeth of sprocket in film, and close clamp
   V. Slide film into channel behind film gate leaving a loop of film above gate
   W. Close film gate by depressing retainer spring
   X. Loop film under roller below film gate
   Y. Pull pressure roller down and loop film over roller and under idler roller
   Z. Open lower sprocket clamp
   AA. Loop film over lower sprocket, engage teeth of sprocket in film, and close clamp
   BB. Push down on loop-former roller and check to make sure there is a loop of film both above and below the film gate. (If not, release upper sprocket clamp and feed more film in from feed reel to make film loops.)
   CC. Thread film around the three idler rollers
   DD. Place take-up reel on rear reel arm
   EE. Attach film end to take-up reel and rotate clockwise to take up slack. (Stop and check threading at this point.)

FF. Rotate thread knob clockwise 3-4 times to make sure loops stay in film
GG. Move "master control" to forward lamp position and run to beginning of film
HH. Adjust focus, volume, and tone as necessary
II. Move "master control" to off position

2. Given directions to operate the Kodak Pageant 16mm projector, the learner will:

A. Run the film forward. (Move "master control" to forward lamp position.)
B. Run the film backward (in reverse). (Move "master control" to reverse lamp position.
C. Operate loop restorer
D. Operate amplifier power switch
E. Operate tone and volume controls
F. Operate focus control

3. Given directions to take down (put away) the Kodak Pageant projector, the learner will:

A. Insert tail end of film to front reel and turn reel counter-clockwise several times to take up slack
B. Pull rewind lever into down position
C. Move "master control" lever to "Forward and Rewind" position
D. When film is rewound, move "master control" to off position and push rewind lever up.
E. Remove both take up and feed reels
F. Remove drive belt from rear reel arm, push arm release and fold arm down
G. Fold front reel arm back
H. Remove speaker (or headphone) plug
I. Switch "Amplifier power" off

To Correct Problems:

A. If projector is plugged in but amplifier, motor, and lamp will not turn on, depress red "circuit breaker" button and release.
B. If picture is not framed properly, turn frame knob until picture is framed.
C. If picture is jumping or sound is mushy, push idler roller below film gate and release, or check threading, or increase size of film loops both above or below film gate. (If condition persists, it may be due to damaged film sprocket holes.)
D. If lamp does not light, check to see if it is burned out.

E. If projector operates but sound is missing (assuming film is not silent film), check to see if sound exciter lamp is burned out. Also check to make sure speaker is plugged in properly and that volume control is not turned all the way down.

4. Given directions to maintain (keep in repair) the Kodak Pageant 16mm projector, the learner will:

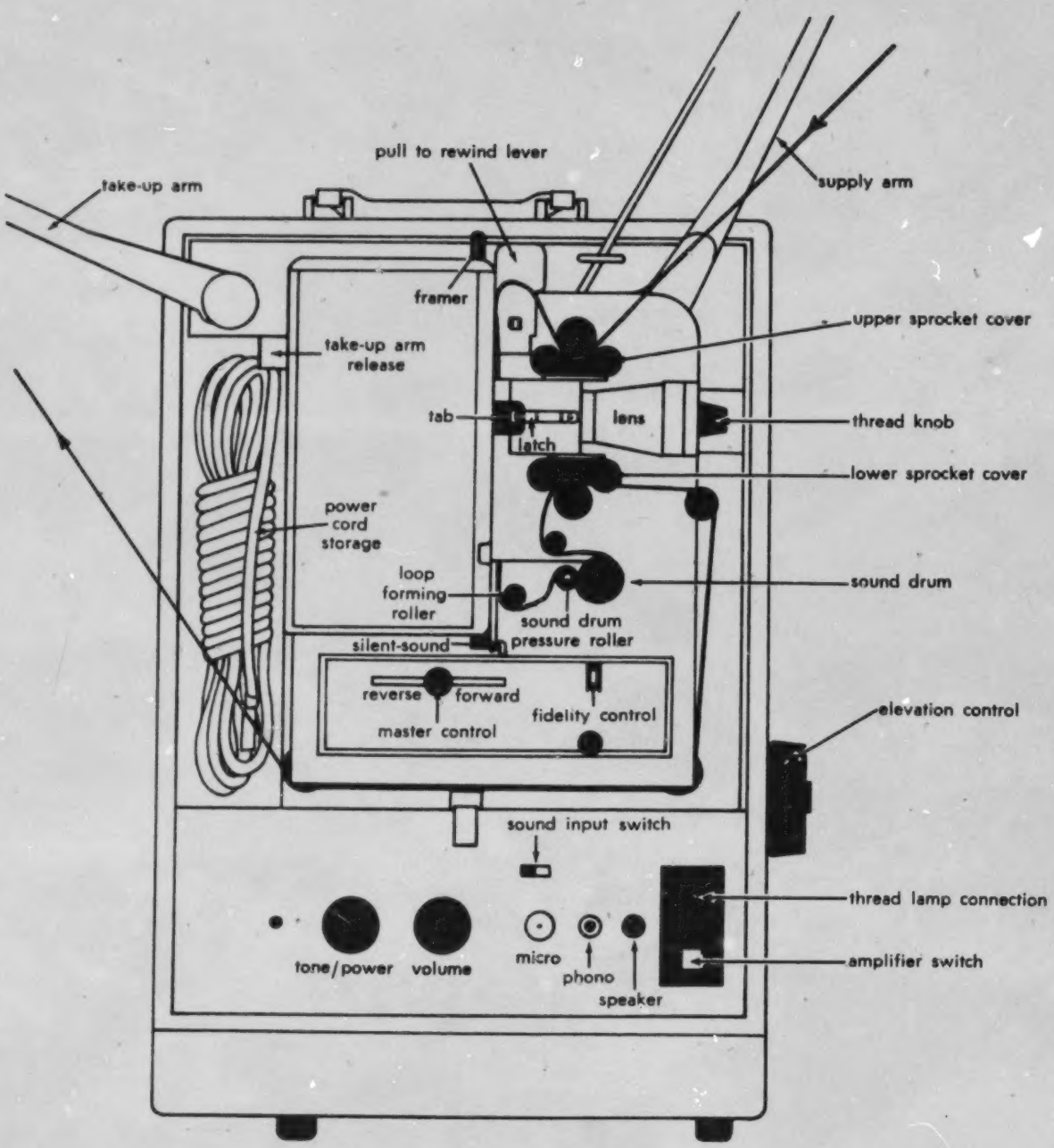
A. To clean optics:

1. Remove lens tube by pulling and twisting counter-clockwise
2. Clean film gate with soft cloth or brush
3. Wipe rear lens element with soft cloth. (Use extreme care!) (Lens element is easily damaged!)
4. Wipe front lens element with soft cloth. (Use extreme care!) (Lens element is easily damaged!)
5. Replace lens tube by pushing and twisting clockwise

B. To replace projection lamp:

1. Unplug power cord! Wait until lamp has cooled!
2. Loosen silver screw on top of lamphouse. (Do not confuse this screw with framing knob!)
3. Lift lamphouse cover up and off
4. To remove lamp, push down on lamp and twist counter-clockwise and lift lamp out
5. Insert replacement lamp, push down, and twist clockwise until lamp locks into place
6. Replace lamphouse cover and tighten screw

Illustration (with components labeled) of the Kodak Pageant 16mm Motion Picture Projector



Area 3--Behavioral Objectives for operating the Bell & Howell 552 Autoload 16mm Projector

1. Given directions to set up the Bell & Howell 552 Autoload projector for projecting films, the learner will:

   A. Remove cover
   B. Uncoil cord and plug into power receptacle
   C. Turn on amplifier (volume) control
   D. Set tone control to center position
   E. Raise front reel arm (until it clicks)
   F. Raise rear reel arm (until it clicks)
   G. Turn Lamp on
   H. (With motor running) select speed--silent or sound
   I. Adjust projection distance (projector to screen distance)
   J. Adjust elevation
   K. Set size of image with zoom control
   L. Focus image
   M. Turn lamp and motor off
   N. Attach reel with film (feed) to front reel arm (sprocket holes should be on side nearest you)
   O. Attach empty (take up) reel to rear reel arm
   P. Trim the end of leader square
   Q. Push autoload lever to right
   R. Turn motor switch to forward
   S. Insert end of film into threading slot (under roller #4)
   T. Quickly move snubber roller (#5) to the left and down so film passes between both rollers
   U. When film extends two feet beyond roller, turn motor to off
   V. Attach film leader to take up reel and rotate clockwise until all slack is taken up
   W. Connect headphone plug into external speaker jack on backside of machine if headphone is to be used
   X. Turn lamp on and run to first few frames
   Y. Adjust focus, volume, and tone as necessary
   Z. Switch lamp off

   To correct problems:

   A. Picture is not framed properly: turn frame knob until picture is framed
   B. If picture is jumping or sound is mushy, depress "system restorer" for about two seconds and release

2. Given directions to operate the Bell & Howell 552 Autoload 16mm projector, the learner will:

   A. Run the film forward (forward control)
   B. Run the film backward (reverse control)

C. Operate still or stop-action control
D. Operate loop ("System") restorer
E. Operate tone and volume controls
F. Operate focus control

3. Given directions to take down (put away) the Bell & Howell 552 Autoload 16mm projector, the learner will:

A. Push release button and raise rear reel arm to vertical position
B. Attach tail end of film to front reel and turn reel counter-clockwise several turns to take up slack
C. Turn motor switch to reverse
D. Press rewind button
E. When film has been completely rewound, move motor switch to off!
F. Remove headphone jack or external speaker
G. Remove both feed and take up reels
H. Rack (move) lens to full rearward position
I. Press arm release buttons and lower both reel arms
J. Turn elevation control to lowest position
K. Unplug cord, coil, and store against front of projector
L. Replace cover

4. Given directions to maintain (keep in repair) the Bell & Howell 552 Autoload 16mm projector, the learner will:

A. To clean the optics:

1. Swing cover door open
2. Swing lens out
3. Clean film gate with cloth or brush
4. Rack (move lens focus control) forward and carefully pull lens type from holder
5. With a soft cloth, carefully wipe rear lens element
6. Replace lens tube (rack all the way in)
7. Swing lens back into place
8. Swing cover door shut

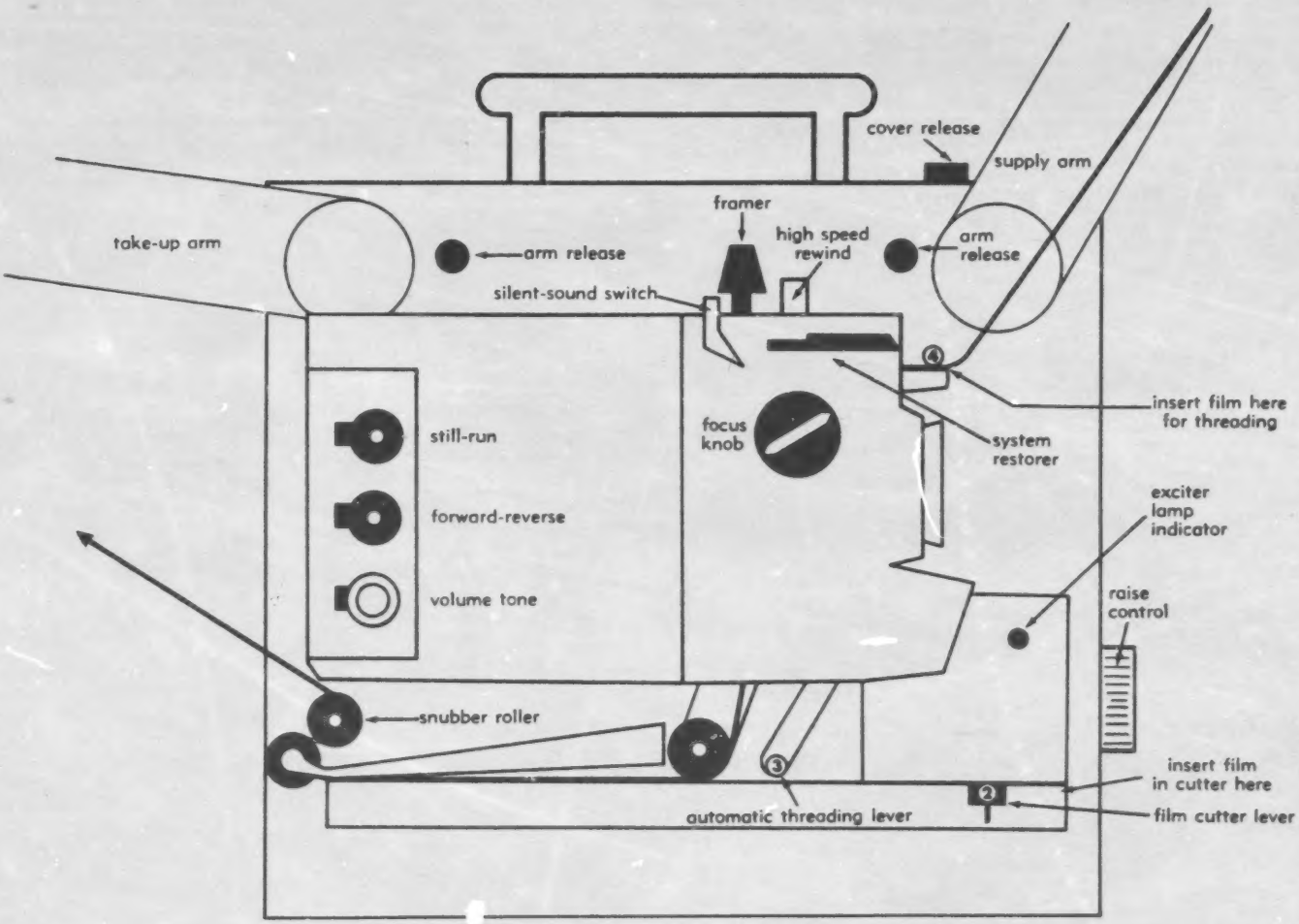
B. To replace projection lamp:

1. Unplug projector
2. Swing lamphouse door open
3. Push up on lamp ejector lever and lift out lamp
4. Insert replacement lamp making sure key on lamp fits into slot of lamp socket
5. Make sure lamp is firmly into socket and close lamphouse door

C. To replace sound exciter lamp:

1. Open cover door for access to sound exciter lamp
2. Unscrew bolt and remove cover
3. Push lamp release lever toward back of projector
4. Turn lamp counter-clockwise and remove burned out lamp
5. Install replacement lamp by pushing down and rotating clockwise
6. Replace cover and tighten bolt
7. Close cover door

Illustration (with components labeled) of the Bell & Howell 552 Autoload 16mm Motion Picture Projector



Area 3--Behavioral Objectives for Operating the Sony AV3600 Video Tape Equipment

1. The student will name the following as the minimum "units" of a video tape system:

   A. Video camera which scans visual images and translates the scene into electronic signals.
   B. Microphone for sound reception.
   C. Video tape recorder which can simultaneously transfer the image and sound impulses to magnetic recording tape.
   D. Monitor (TV set) which reproduces the visual and sound images recorded by the camera, microphone, and video tape "units".

2. Given directions to set up a video tape system for recording, the student will:

   A. Plug in the microphone
   B. Connect the VTR unit and the camera (6-pin connector)
   C. Plug the camera power cord into the VTR outlet
   D. Connect the VTR unit and the TV monitor (8-pin connector)
   E. Remove lid of VTR unit and thread tape

3. Given directions to record off camera, the student will:

   A. Turn on the VTR unit, camera and TV monitor
   B. Remove the lens cover from the camera
   C. Put the camera light level switch on "high" and the sync selector to "ext".
   D. Elevate, tilt, and pan the camera to the subject to be recorded.
   E. Focus, adjust lens opening, zoom lens, contrast, brightness, horizontal hold, vertical hold.
   F. Move the VTR/TV selector on the monitor to "VTR" position.
   G. Move camera/line/TV selector of VTR unit to the "camera" position.
   H. Push down on the VTR Unit's record button and move the lever to forward.
   I. Record a short segment with both audio and video (video will demonstrate shots with panning, zoom in and out, sharp focus, and contrast).

4. Given directions to play back the segment, the student will:

   A. Rewind the tape.
   B. Move the lever to the forward position.

5. Given directions to record new audio on the tape while leaving the video undisturbed, the student will:

   A. Rewind the tape to the beginning of the recorded segment.
   B. Press the "audio dub" button down while moving the lever to "forward".

6. Given directions to record a short segment of a TV program off the air, the student will:

   A. Move the VTR/TV switch on the monitor to the TV position
   B. Using the channel selector, locate a broadcasting station
   C. Move the camera/line/TV selector on the VTR to the "TV" position
   D. Hold down the record button on the VTR and move the lever to forward
   E. Record a short segment, rewind and replay the segment.

7. Given directions to take down the video tape recording system, the learner will:

   A. Rewind the tape and replace both the take-up reel and the tape reel into their cartons.
   B. Make sure that the camera, tape recorder, and TV monitor are turned off. (NOTE: The tape recorder is turned off by pressing down on the power button and letting it spring back up to the high position. The pilot light near the button will go off when the power is off.)
   C. Replace the lid to the video tape recorder.
   D. Replace the lens cover on the camera.

Illustration (with components labeled) of the Sony Videotape Recorder

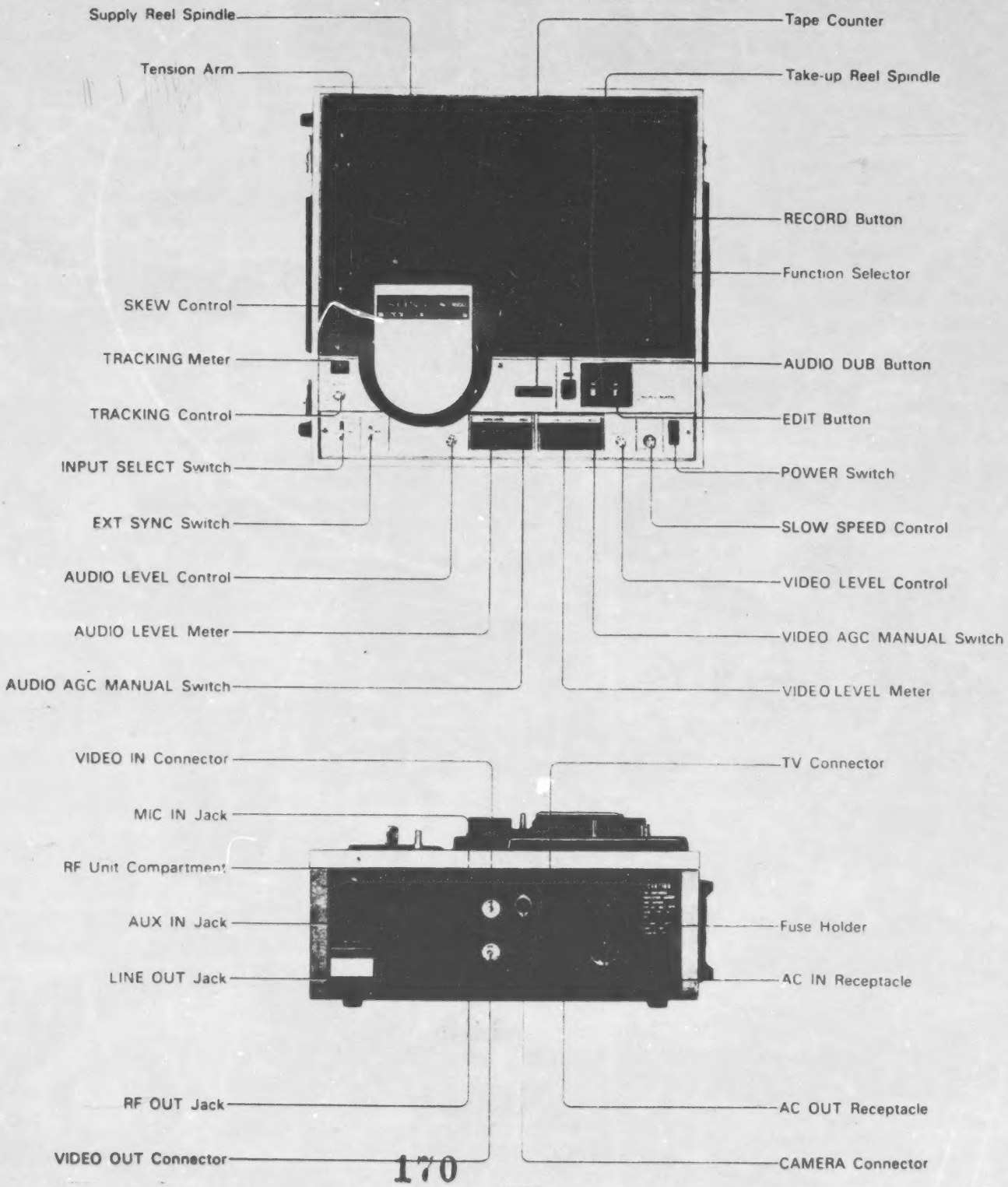
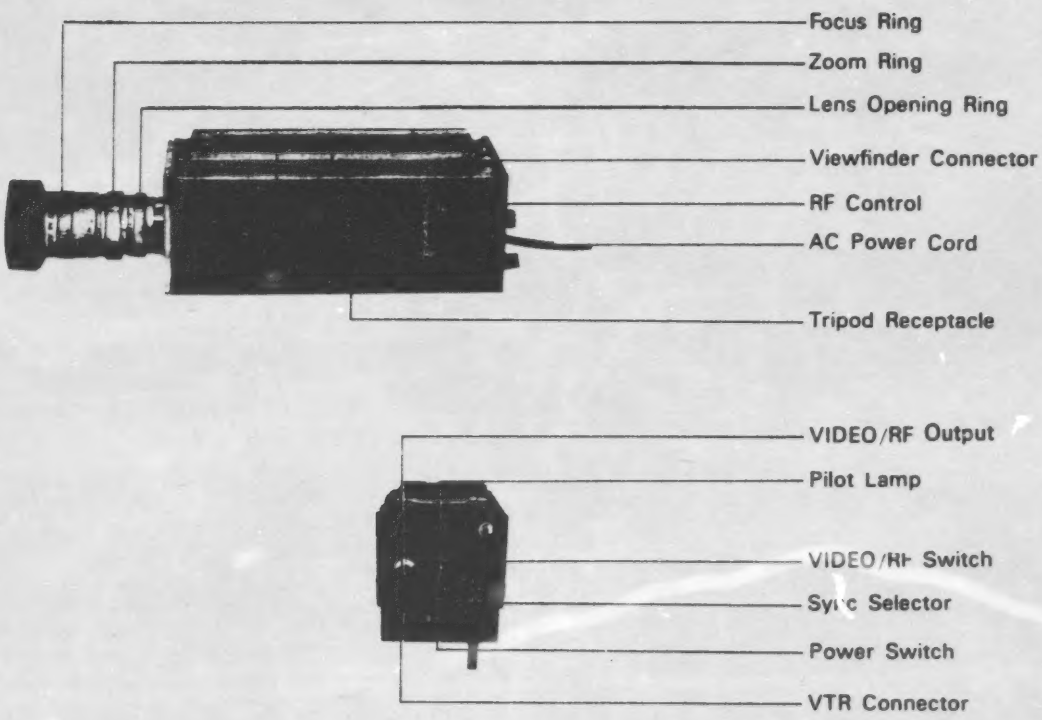


Illustration (with components labeled)
of the Sony Television Camera



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MODULE #4--PRINT MEDIA, DUPLICATION AND DISPLAYS

Introduction

Long before the invention of electricity, the only important media was the printed word. Its importance cannot be underemphasized especially when one considers that for hundreds of years this "Gutenberg Technology"--as it is sometimes called--was the major impetus for change, development, and expansion of knowledge. We tend to forget this contribution and the value of printed materials and are sometimes seduced by the fireworks and razzmatazz of the electronic media. Still, the printed word is the largest single medium for the communication of words, pictures, and ideas.

This module is designed to help the instructor refocus upon print media, its duplication and ways in which it can be used in instruction.

Recommended Procedure You should Follow

1. Note the Areas below and where various aspects of them are located in this MODULE.

Areas	Behavioral Objective	Type of Instruction	How Tested
1. Print media, duplication and displays	p. 203	Monograph (p. 207)	Test
2. Operation of standard Rocket Spirit Duplicator	p. 233	Audio-Slide (SISC) 301-0291 or Packet #13	Check-out

2. Take the Pre-Test which begins on p. 199 to determine what you already know about Area 1 above. Use the key following the test (p. 202) to see how you fared.

3. If the Pre-Test reveals that you need additional study in Area 1, study the Behavioral Objectives for Area 1 (p. 203) and work through the instruction that is offered in the Monograph (begins on p. 203). Note that space has been provided after each behavioral objective so that you can take notes while studing the instruction.

4. To see how well you are prepared in Area 1 after instruction, take the Post-Test which begins on p. 227. Note the objective numbers which preceed the correct answer on the answer key following the Post-Test. They will refer you directly to objectives with which you still may be having trouble.

5. Look at the Pre-Test for Area 2 (p. 231) on the operation of the Standard Spirit Duplicator. Can you do these things? If so, fine, you can successfully check-out. If you can't do some or all of them, study the Behavioral Objectives for Area 2 which begin on p. 233 and work through instructional packet #13 or come to the Self-Instructional Systems Center and work through set #301-0291. After this instruction, you should have no trouble checking out.

Selected Readings

	Pages
Gerlach, Vernon S. and Donald P. Ely, A Systematic Approach, Prentice-Hall, 1971.	340-343 365-370 371-375
Kemp, Jerrold E., Planning and Producing Audiovisual Materials, 2nd Edition, Chandler, 1968.	91-128 221-226 137-141
Dale, Edgar, Audiovisual Methods in Teaching, 3rd Edition, Dryden Press, 1969.	323-347 444-453 508-566 624-691
Brown, James W., Richard B. Lewis and Fred F. Harcleroad, AV Instruction: Technology, Media and Methods, 4th Edition, McGraw-Hill, 1973.	49-114 145-162 263-321 507-520
Wittich, Walter Arno and Charles Francis Schuller, Instructional Technology: Its Nature and Use, Harper and Row, 1973.	83-190 551-594
Minor, Ed and Harvey R. Frye, Techniques for Producing Visual Instructional Media, McGraw-Hill, 1970.	3-158

Pre-Test for Area 1

1. Which of the following is not an advantage of books for instruction?

   A. convenient to store and retrieve
   B. can present much information
   C. usually written for a general, non-specific audience
   D. many titles available

2. Which of the following is not an advantage of periodicals for instruction?

   A. inexpensive
   B. generally profusely illustrated
   C. always up-to-date
   D. easily destroyed--not durable for repeated use

3. Which of the following is not an advantage of microforms for instruction?

   A. image is often of poor quality
   B. inexpensive
   C. large copies easily made on reader-printer
   D. less prone to theft

4. Which of the following is not an advantage of printed programmed materials for instruction?

   A. students tend to fatigue with prolonged use
   B. inexpensive
   C. goal-specific and performance oriented
   D. self-pacing

5. Which of the following is not an advantage of photographs for instruction?

   A. easily produced
   B. unless protected, can be easily damaged
   C. inexpensive
   D. quickly produced

6. Which of the following is true of handouts as used for instruction?

   A. teacher producible
   B. ideal for topical in-class materials
   C. easy to prepare
   D. All of the above
   E. None of the above

7. Which of the following is not one of the characteristics of spirit process duplication?

   A. prints only in purple
   B. stencil may be produced by pen or typewriter
   C. one stencil produces less than 100 good copies
   D. image fades with time

8. Which of the following is not a characteristic of mimeograph process duplication?

   A. stencil can only be produced by typewriter
   B. quality of images is from good to acceptable
   C. image is permanent (won't fade)
   D. one stencil produces 500 to 1000 copies

9. Which of the following is not one of the characteristics of offset process duplication?

   A. quality of image is excellent
   B. usually requires trained operator
   C. permanent image
   D. only a few copies per stencil

10. Which of the following is not a characteristic of photocopy duplication?

    A. limited quality image
    B. quick process
    C. expensive for over ten copies
    D. cannot copy from book

11. Which of the following is not true of instructional displays?

    A. establishes environment for learning
    B. displays are effective even when left up a long time
    C. displays invite student involvement
    D. inexpensive and simple to prepare

12. Which of the following is not a rule for good pictorial composition and presentation?

    A. use dim lighting for emphasis
    B. use of titles and captions
    C. use contrasting sizes
    D. include as many items as possible

13. You are instructing a group of student nurses and your students want to help you acquire a library of some of the better mannuals in health care. You will keep this material and use it in many subsequent classes with many students. You will check the material out and back in. Which kind of printed medium below would you recommend?

A. soft cover books
B. hard cover books
C. microform
D. programmed instruction
E. periodicals

14. You are teaching a class in industrial mathematics and want to individualize instruction but still provide each student with his own materials. The company or school district you work for will not provide you with media equipment which you can leave in your instructional area. Which kind of printed medium below would you recommend that your school buy for you?

A. periodicals
B. soft cover books
C. microform
D. photographs
E. programmed instruction

15. You are giving the ground school portion of flight instruction and you would like to build a small, inexpensive library of material related to various flying techniques. You don't have much of a theft problem but you want the material to last a year or so. Which printed medium below would you recommend for purchase?

A. periodicals
B. hard bound books
C. microform
D. soft bound books
E. programmed instruction

16. You have been selected to chair a meeting in which 500 or so people will be involved. You need to prepare an agenda for this meeting which takes place within a couple of days. Which duplication process would you choose?

A. spirit duplication
B. mimeograph
C. photocopy
D. offset

Pre-Test Key

Question Number	Correct Response	Module Number	Area Number	Behavioral Objective#
1	C	6	1	1
2	D	6	1	2
3	A	6	1	3
4	A	6	1	4
5	B	6	1	5
6	D	6	1	6
7	A	6	1	8
8	A	6	1	9
9	D	6	1	10
10	D	6	1	11
11	B	6	1	13
12	A	6	1	14
13	B	6	1	7
14	E	6	1	7
15	D	6	1	7
16	B	6	1	12

To consider yourself competent in this MODULE (for Area 1), you should not have made more than two errors.

Area 1--Print Media, Duplication and Displays--Behavioral Objectives

1. The learner will be able to select statements which identify eight characteristics of books as instructional media.

   A.
   B.
   C.
   D.
   E.
   F.
   G.
   H.

2. The learner will be able to select statements which identify seven characteristics of periodicals as instructional media.

   A.
   B.
   C.
   D.
   E.
   F.
   G.

3. The learner will be able to select statements which identify seven characteristics of microforms as instructional media.

   A.
   B.
   C.
   D.
   E.
   F.
   G.

4. The learner will be able to select statements which identify the following six characteristics of printed programmed instruction.

   A. Instruction oriented to specific objectives
   B. Self-pacing
   C. Divided into psychologically "digestible" steps
   D. Inexpensive
   E. Sometimes bores students with its repetitive style
   F. Students tend to "fatigue" with prolonged use

5. The learner will be able to select statements which identify the following five characteristics of photographs as instructional media.

   A. easily produced
   B. inexpensive
   C. quickly produced
   D. "Amateurish" quality can hamper instructional effect
   E. unless protected, can be easily damaged

6. The learner will be able to select statements which identify the following seven characteristics of printed handouts as instructional media.

   A. can be quick to prepare
   B. easy to prepare
   C. inexpensive
   D. instructor producible
   E. ideal for topical in-class materials
   F. can consume too much time in preparation
   G. do not have "status" of commercially produced materials

7. Given hypothetical instructional situations in which the instructor has to select the most appropriate form of printed media, the learner will be able, from a list of proposed situations involving printed media, select the one most appropriate.

8. The learner will be able to select statements which identify five characteristics of spirit duplication.

   A.
   B.
   C.
   D.
   E.

9. The learner will be able to select statements which identify four characteristics of mimeograph process duplication.

   A.
   B.
   C.
   D.

10. The learner will be able to select statements which identify five characteristics of offset process duplication.

    A.
    B.
    C.

D.
E.

11. The learner will be able to select statements which identify five characteristics of photocopy duplication.

A.
B.
C.
D.
E.

12. Given hypothetical teaching situations in which the instructor needs to select the most appropriate form of duplication, the learner, from a list of duplication procedures, will select the one most appropriate.

13. The learner will be able to select statements which identify the seven characteristics of instructional displays.

A.
B.
C.
D.
E.
F.
G.

14. The learner will be able to select statements which identify the eight rules for good pictorial composition and presentation.

A.
B.
C.
D.
E.
F.
G.
H.

Area 1--Print Media, Duplication and Displays--Monograph

In this module we are going to consider three closely related aspects of media: print media, duplication and displays. When considering media for instruction, these items are often given short-shrift. This is due largely to the fact that print media have been around for a long time and we tend to direct our attention to the newer and flashier forms of media. But in fact, print media have no adequate substitute in many instructional applications. Therefore, we would be remiss in not considering print media, duplication, and displays, as we think these three items are very important in any discussion of media for use in schools and governmental and business instructional applications.

Print Media

We can identify six major types of print media: (1) books, both hard cover and paperback; (2) periodicals, which would include magazines, newspapers, and journals; (3) microforms, which include microfilm, microfiche and ultrafiche; (4) programmed instruction in printed form; (5) photographs, which include flat pictures; and (6) handouts. Handouts are duplicated materials such as those produced by the mimeograph, the spirit duplicator, and the offset press machines.

All six of the foregoing major types of printed instructional materials have five general characteristics that can be considered advantages for instruction. First of all, they have a very long shelf life (they will store indefinitely). One exception to this are copies produced by the spirit duplicator, which fade after a period of time. Print media, when compared to other kinds of media, are inexpensive with photographs being the most expensive of this group. Printed forms of media are generally easily replaceable. Books can be reordered and back copies of periodicals can be obtained or copied from someone who has the needed periodical. Back copies of material are likely to be available in microform, programmed instruction can be ordered for almost any subject, photographs can be reprinted from negatives and more handouts can be cranked out if they are needed. Print media are easily copied. Many of the newer copying machines such as the Xerox and the new 3M copier will handle any of the materials that we have mentioned. However, copiers as yet have not been developed which copy in color at a reasonable cost. The last of the five general characteristics of all print media is that a wide range of materials is available. There are probably more instructional materials available in printed form than all the rest of the media combined.

Because of the characteristics we have just mentioned, we think that it is apparent that print media provide the most convenient way of individualizing instruction--provided your learners can learn by reading. Of course one of the big problems of printed instruction, which we will discuss more in the next module, is that the abstract and vicarious nature of print instruction generally requires that the learner have prior experience in order to learn efficiently and effectively from printed material. Naturally, these people you instruct will have to have attained a certain degree of reading ability. Also, because they are abstract, it is sometimes difficult to build an interest in printed works. Instructors are now beginning to recognize this problem and are hiring professional writers and editors to produce instruction for students, rather than relying on professional educators.

Books

Books as a type of instructional material have the following advantages and disadvantages. Many titles of books are available, literally millions of titles of books. Also, books are relatively inexpensive. Even with the increase in printing and paper costs, books are among the most inexpensive of media. Also they are portable. It is easy to carry a book from place to place. Books are convenient to store and retrieve. They fit nicely on shelves, although it is sometimes a bit inconvenient to store books if they are of different sizes. Because print is small and books can be large, a tremendous amount of information can be presented in each book. Books are well suited to individualized instruction. This is mainly because books can be easily handled by individuals and it doesn't take any training at all to teach someone to turn a page. And books, particularly paperback books, can be provided economically for each student.

However, books usually require a high reading ability--a major disadvantage of any printed material. The student has to be able to read. Furthermore, the student has to have the background in order to learn vicariously from something as abstract as the printed word. Another problem with books, particularly with most hard bound books, is that they are written for a general audience. Therefore, they sometimes do not lend themselves to specific learning situations. The reason hard bound books are usually written for a general audience is because the cost of producing them is greater and the publisher of the book has to sell many of them just to recover his costs. To do this they have to reach as wide an audience as possible, so they are written for wide appeal rather than directed toward a single learner task. Since paperbacks are cheaper to print, the publisher can recover his costs with fewer copies being sold. A problem that many of

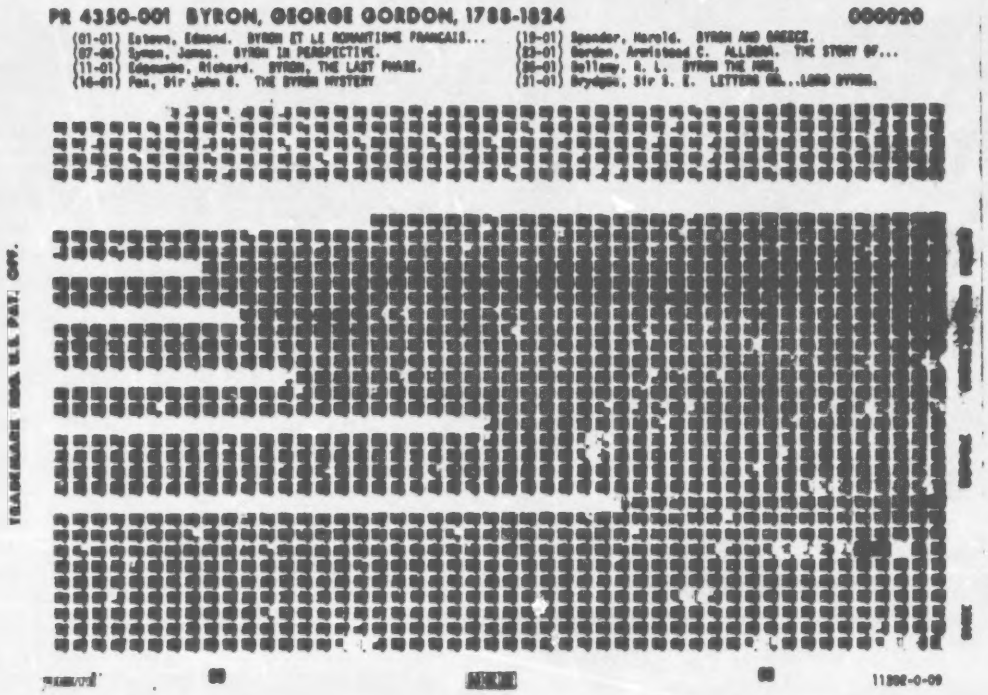
us have as instructors is that we tend to like books. In fact most of us have been very successful in learning from books and it is sometimes difficult for us to put ourselves in the place of a student who has a difficult time reading or who has had parents who have not set an example for the student by reading. It is hard for us to see why everyone else doesn't like to read books. As a result we generally tend to relegate too much learning to reading. We should be much more discriminatory as to the kind of learning that we expect students to do with books and be much more concerned about the type of audience expected to read the books. This is one of the reasons why we need to concern ourselves with alternate forms of instruction. Books are fine for those who can learn from them, but we should provide other kinds of instruction for those who have a difficult time from a printed page.

Periodicals

Closely related to books are periodicals (journals). Periodicals have the advantage that the information in them is generally up to date (if you use current periodicals). There are journals for almost every subject and professional group you can think of. Periodicals are generally profusely illustrated and often the illustrations are of very high quality. Periodicals are also comparatively inexpensive. However, they require reading ability just as books do. Usually, though, periodicals are often written in a more casual manner and, for many people, are easier to read. Periodicals are easily destroyed, and are not very durable for repeated use. However, if an instructor were going to use journals, he could have copies made on a copy machine and then put these copies somewhere for students to use. Periodicals usually deal with current topics and for this reason the information in the periodicals goes out of date rather quickly.

Microforms

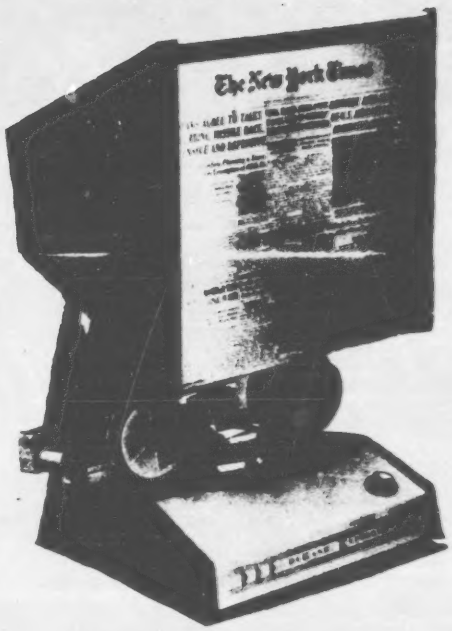
Technically, microforms are not printed instructional materials. However, microforms are used almost exactly like printed materials except that the microform is most often in the form of film. Microforms are found generally in two forms, microfilm (reel) and microfiche (4" x 6" cards). The kind of information you would find on microforms is usually from journals, particularly when a library has decided to keep their back issues in the form of microform instead of binding the periodicals yearly. Generally microforms are reduced about twenty-five or thirty to one. However, a new kind of microform called "ultrafiche" is reduced something like 250 to one.


PR 4350-001 BYRON, GEORGE GORDON, 1788-1824 000020
(01-01) Estève, Edmond. BYRON ET LE ROMANTISME FRANCAIS...
(07-06) Symon, James. BYRON IN PERSPECTIVE.
(11-01) Edgcumbe, Richard. BYRON, THE LAST PHASE.
(16-01) Fox, Sir John C. THE BYRON MYSTERY
(19-01) Spender, Harold. BYRON AND GREECE.
(23-01) Gordon, Archibald C. ALLEGRA. THE STORY OF...
(26-01) Bellamy, E. L. BYRON THE MAN.
(31-01) Brydges, Sir S. E. LETTERS ON...LORD BYRON.
TRADEMARK 1966 U.S. PAT. OFF.

The ultimate in microfiche. This is called ultrafiche and there are 3,360 pages on this single card!

A twelve hundred page book can be put on a card measuring 4 x 6 inches! Microforms are less prone to theft than regular printed material, because they can't be read without a special reader. Microforms are very durable. They last a long time and don't fade. Microforms are comparatively inexpensive. It is as cheap, if not cheaper, to have bound periodicals in the form of microfilm or fiche than in book form. Certain rare books would be unavailable at almost any price to libraries, but people who own such books often let microform companies make copies of the books and thus these copies can be purchased and made available to users. Another advantage of microforms is that some microform readers have a built-in copier which allows you to make an 8 1/2" x 11" copy of whatever you see on the screen.

A disadvantage of microforms is that the microfilm and microfiche readers are often inconvenient, if not actually difficult to use.



A microfilm reader. Note that the microform is reel-to-reel (35mm) and that the image from one of the frames is being projected on the screen.

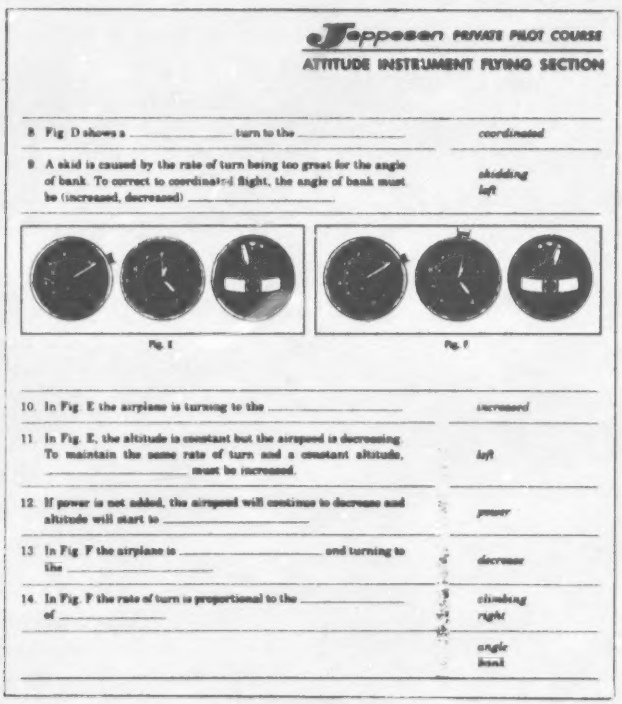
If you have ever had any experience with such a reader or reader/printer you will know what we mean. It is sometimes difficult to locate material on cards and it can be difficult to thread the microfilm roll into the reader. With the earlier projectors the image was often of poor quality. This has been improved somewhat, but even with the newer models it is somewhat difficult to look at the images on the microfilm or microfiche reader in a brightly lighted room without eye strain. Another problem, with microfiche particularly, is that the cards are very small (4" x 6"), and consequently, they can easily get lost in a card file. One has to be very careful when they are removing or replacing cards to see that they get in the right spot. There is little doubt that you as an instructor will have more and more contact with microforms primarily because of the space-saving advantage they have over other forms of media. Note the next time you have your car services and need parts, that the parts manager will look up the needed items on microfilm or fiche.

Programmed Instruction

Programmed instruction has had its ups and downs on the education scene. A couple of times in the last twenty years or so it received great publicity as a method for revolutionizing instruction. Soon after it would fall in disrepute (like all purported-to-be panaceas for education) and be forgotten about for a while. Programmed instruction is becoming increasingly

popular with the increased emphasis today on competency-based instruction (student's learning is assessed by their ability to perform certain specified tasks). The reason for this is that programmed instruction is oriented toward students achieving specific objectives. Programmed instruction is self-pacing. It is designed so that users can proceed at their own rate. It is divided into psychologically digestible steps. It is designed in such a way that students are asked to make responses and are reinforced for correct responses at appropriate times.

Well-designed programmed instructional materials frequently include visuals.



Jeppesen PRIVATE PILOT COURSE

ATTITUDE INSTRUMENT FLYING SECTION

8. Fig. D shows a _____ turn to the _____ — *coordinated*

9. A skid is caused by the rate of turn being too great for the angle of bank. To correct to coordinated flight, the angle of bank must be (increased, decreased) _____ — *skidding left*

Fig. E Fig. F

10. In Fig. E the airplane is turning to the _____ — *increased*

11. In Fig. E, the altitude is constant but the airspeed is decreasing. To maintain the same rate of turn and a constant altitude, _____ must be increased. — *left*

12. If power is not added, the airspeed will continue to decrease and altitude will start to _____ — *power*

13. In Fig. F the airplane is _____ and turning to the _____ — *decrease*

14. In Fig. F the rate of turn is proportional to the _____ of _____ — *climbing right angle bank*

Programmed instruction is generally inexpensive, even less expensive than bound books (programmed instruction is usually in paperback form). Many times programmed instruction has the added advantage that the instruction is validated--the designer has tried out his program on students much like the target students that the instruction was designed for in the first place. Publishers of these materials will often provide you with data to indicate how well the programmed instruction meets its objectives.

There are a couple of rather serious disadvantages with programmed instruction, however, and you are probably aware of them if you have used a programmed text. First, sometimes the students are bored with the very repetitive style. You read a few paragraphs or sentences and you are asked to make a response. The desired response is often very obvious--then you go on and make another response and so on. Also, students seem to tend to fatigue easily when they use programmed instruction for any length of time. These are serious criticisms of programmed instruction and the wise instructor will make judicious use of this medium. And, because it is objective-oriented, the instructor must make very sure that the program's objectives match his.

Programmed instruction might be more familiar to you as computer-assisted instruction. In this type of instruction, students interact with a computer and get instant feedback--they know right away whether their responses were correct.

Student interacting with a computer via a typewriter like keyboard.

Simply stated, computer-assisted instruction is programmed instruction put into a computer. Often, however, printed programmed instruction is as effective as computer-assisted instruction. It is our belief that in many cases in which the computer has been considered the most effective presenter of information, the information could be presented almost as effectively with printed programmed instruction at far less cost. In conclusion, the programmed instruction does have a great deal of potential for instruction, particularly competency-based education.

Photographs and Flat Pictures

Photographs and flat pictures are most often used by instructors when they are arranging displays.

Students examining study prints made from original photographs of artifacts from the moon.

It is easy to see their advantages and disadvantages. For one thing, they are easily produced or obtained. Most of us have certain skills in operating cameras and even if we don't, the skills are not difficult to learn. Photographs are generally inexpensive--averaging perhaps 25 to 50¢ per developed shot. They are quickly produced, especially by the Polaroid type of camera which gives you a picture in a minute or less. The new XR70 Polaroid produces a color print in a few seconds. Although photographs are easily produced, unless you are familiar with good photographic techniques your photographs can have an amateurish quality that can actually hamper the instructional effectiveness for which they were designed to achieve. Another problem with photographs is that they can be easily damaged. With repeated handling, photographs tend to crack and they need to be protected when stored. (This may not be a disadvantage for instructors who regularly remove outdated photographs from their files). The useful life of pictures can often be extended by mounting these on an appropriate material, e.g., tagboard, cardboard, railroad board, etc.

Dry mounting and/ or laminating pictures or posters is a good way to preserve and protect them.

Flat pictures can be obtained from magazines and then protected by being laminated with clear plastic.

Handouts

The last major type of printed instructional material described here is the printed handout. Almost all instructors use handouts at one time or another. At times they are used in the place of textbooks. At other times they are used when a teacher wants to present information to students at an opportune time but hasn't had enough time to select or really develop the material beforehand--in other words, handouts are generally quick to prepare. (More on this in a later section of this monograph.) Usually they are easy to prepare either with a typewriter or by hand. They are relatively inexpensive. A spirit duplicator master usually cost between a nickle and a dime and then, of course, you have only the cost of the paper and duplicating fluid after that. They are instructor-producible. The instructor can make a handout on a typewriter or by hand very easily and simply. No special skills are needed. It is as easy to write on a master as it is on a piece of paper. However, if you make an error you must use a correction fluid on the offset or mimeograph and a razor blade to scrape off the purple transfer on a spirit duplicator master.

Printed handouts are ideal for topical material in instructional settings. But, while handouts can be "run off" quickly, they can consume much time in the initial preparation. If you have only a day or so to prepare for a presentation, and you plan to distribute handouts, it will be necessary for you to allow ample time for preparing this material well in advance of the class

time. Usually handouts don't have "status" of commercially-produced materials. They simply aren't as high quality, and they often look amateurish. This can destroy their effectiveness with your audience. They may look at handouts and shrug them aside as not being important simply because they don't have a professional look.

DUPLICATION

Duplication includes handwritten notes, typewritten notes with carbons, photocopies, spirit duplicator copies, mimeograph machine copies, and offset press copies. The handwritten and typewritten processes are familiar to everyone. All you need is typing and carbon paper, and with an electric typewriter you will be able to make six or seven satisfactory copies. This has prov d to be a handy way for an instructor to get quickly a few copies of needed information. The development, in recent years, of the pho ocopy technique has greatly reduced the need for carbons.

Photocopies

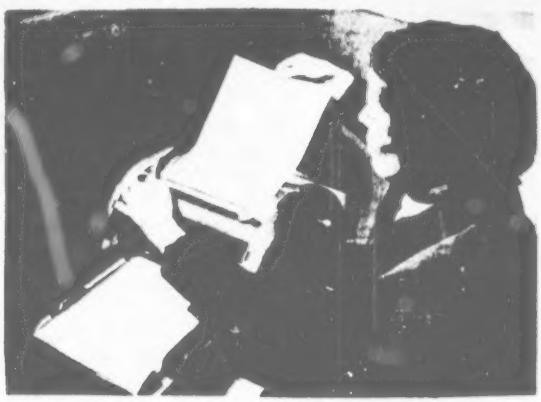
You are familiar with the photocopy technique as the products of the Thermofax machine, the 3M 209 machine, the Xerox machines, AB Dick machines, SCM machines, etc. There are many different brands of photocopy machines but they all do one thing--they all make a quick copy. In fact, their chief advantage is the fact that the copies can be produced very quickly, as they do not have to be retyped or redrawn. However, photocopy duplication is expensive when making over ten copies--usually around 10 cents per copy at a library or educational institution, around 3¢ if you own your own machine. There are some other problems with photo-copy duplication. The quality of the copy is often poor with some of the earlier equipment. Some photocopies are insensitive to particular colors or to shaded drawings. Then, you have the problem of the machine being low on fluid or toner or some problem that causes the image not to be as clear as you would like. The more useful kinds of photocopy machines will copy bound materials. That is, you do not have to tear a page out of a book and insert it through the machine. Instead you can open the bound material, sav a book, and place it face down on a glass screen. The machine will copy that page and you flip the page over and it will copy the new page. Most of the time, with many of these machines you can then take the copy you have made and make a thermospirit duplicating master. You can then make inexpensive dittoed copies for your instructional group. However, unless everything goes

pretty well, you might have copies that are difficult to read. It takes some practice to learn this last technique.

Spirit Duplication

The spirit duplicator is a machine that you either have already learned or will learn to operate as you work in this module. You are probably familiar with the spirit duplicator, as this is the machine that produces the paper that has the strong pungent odor and the purplish color print.

The spirit duplicator.



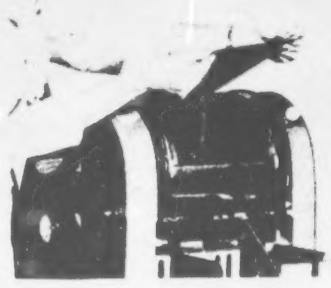
This system has been in use for a long time and is still very adequate for certain applications. A spirit master can be produced by pen, pencil, and typewriter. While a spirit master can be prepared easily, it is somewhat difficult to correct. If an error has been made, a razor blade is handy to use for scraping off the blue carbon on the back of the spirit master. To avoid taking the spirit master out of the typewriter when making corrections, place the spirit master in the typewriter bottom edge up. Then the correction can be made without removal. One master will generally produce approximately one hundred good copies. This may not be a problem to you if you are working with a group of twenty-five or thirty. But as you print upward to 100 copies on one spirit duplicating master, the image begins to fade quite quickly. Fading during storage is another problem. The image fades with time, particularly if you put the spirit duplicated copies on a bulletin board (in two or three months they will be illegible). Sometimes the spirit duplicated copies do not have a sharp image. In fact, we will say that the image is from acceptable to poor. If you desire a really sharp image, avoid spirit duplication. In addition to the traditional blue or purplish image, we now have different colored masters available: red, yellow, and the whole spectrum (but the very familiar blue-

purple colored master is still the most popular). Virtually every school in the country has at least one of these machines. Some are manually operated while others are electrically operated.

Mimeograph

A duplicating process which produces higher quality copies than the spirit duplicating process is mimeographing.

A mimeograph machine.

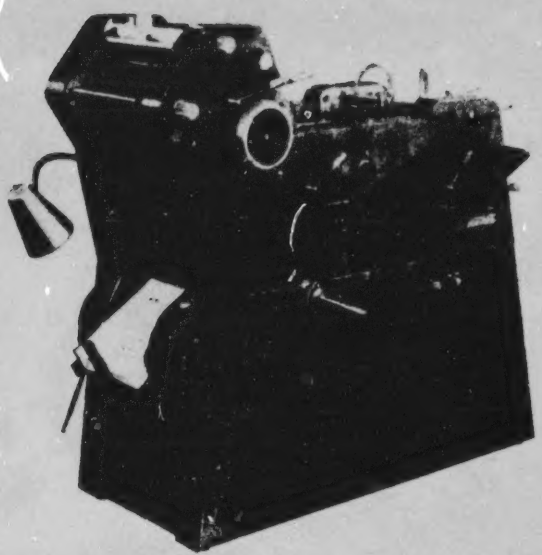


A mimeograph stencil can be produced by an electric or manual typewriter, although the manual doesn't always give a clear, sharp cut on the stencil. You may also use a stylus. and a special stencil cutting machine is available which makes a stencil automatically from a typed or printed page. If you have looked at a typed mimeograph stencil, you will note that the numbers and letters are cut into the stencil, therefore one mimeograph stencil will produce from 500 to 1,000 clear copies. Also, the image is reasonably permanent; it won't fade nearly as quickly as spirit duplicated copies will. And, the quality of the image ranges from acceptable to good. While the image is obviously not type-set, it is better than a spirit duplicated copy. Most institutions which have mimeograph equipment limit the operation to trained personnel. Consequently, you may have to give a secretary some lead time to prepare materials you wish mimeographed.

Offset Printing

The offset process is the newest type of printing commonly available to instructors'. As you are reading this information, you might note what it looks like because your course manual was printed by the offset process.

An offset press.



A great deal of printing that is done nowadays is not typeset, but is prepared by offset equipment. It is not necessary that you know the mechanics of offset printing but you should be familiar with the information that follows. It is the best way of duplicating materials when you want many copies, almost an infinite number, and you want the printing to be of a high quality. In addition, the machine that produces the offset copies produces them very quickly and the image is virtually permanent. However, the disadvantage is that the offset press requires a trained operator, that is, a person who does little else other than run the offset press. Offset presses are fairly expensive, costing anywhere from seven to ten thousand dollars. If you know that you are going to run a great number of copies and wish to reuse the master, then you should have a metal plate prepared. This requires special equipment. If, on the other hand, paper masters are to be used, these can be made on a regular typewriter. However, the typewriter you use must be of the carbon ribbon type. Most of the IBM typewriters are of this type and many of the newer models from other manufacturers also use carbon ribbons.

Instructors should become familiar with each duplication process in order to select the type that best suits their particular need. Most instructors will be involved at one time or another with all the types of duplication that we have discussed in this module.

DISPLAYS

There are seven types of instructional displays that are commonly used in the instructional process.

An example of a good exhibit.

While many of the types that will be described here are more often found in elementary schools, it is our opinion that if instructors on the secondary and adult level would use displays more often, their instruction would be more effective, particularly when new units are being introduced.

The seven types of displays are:

1. Bulletin boards: You are familiar with the various kinds of bulletin boards. They can be used at all levels of teaching effectively, including the college, university, and adult levels.

2. Collections and exhibits: A collection is the kind of thing you are likely to see in a window box display. A typical exhibit would be like a car dealers show room when the new models are being introduced. Both collections and exhibits are very effective for engineering initial interest.

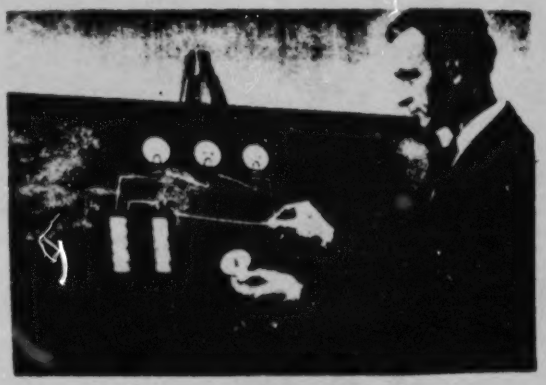
3. Felt board or flannel board: This is simply a piece of felt, or flannel stretched over a board upon which you place other pieces of flannel.

A flannel board.

Flannel sticks to flannel, therefore, you can make an attractive display using colored pieces of felt or flannel and placing them on the stretched piece of flannel.

4. Magnetic board: A magnetic board is a flat metal surface on which information is placed and is held in place by a magnet.

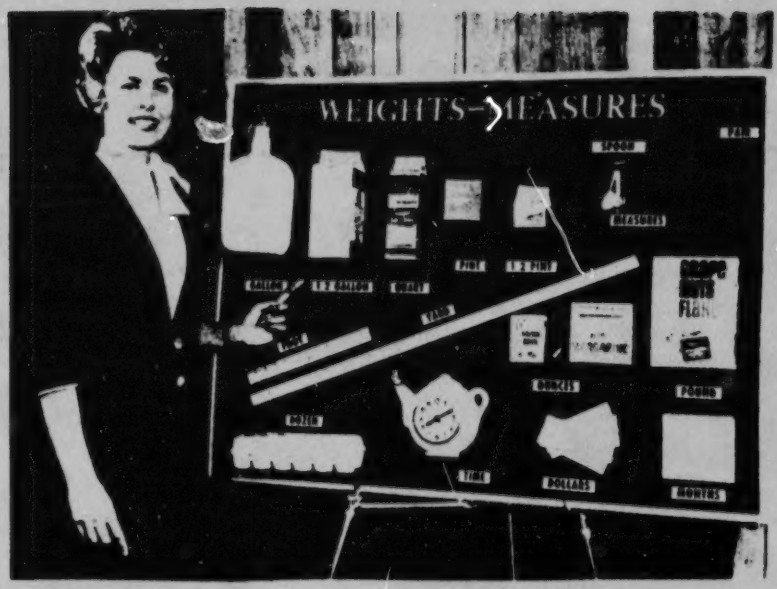
A magnetic board. Note the magnet on the back of the disc he is holding.



For example, if you want to diagram a basketball play, you could use magnets on a magnetic board to show how the players should react to various offensive and defensive tactics.

5. The hook and loop board: The hook and loop board is very similar to the felt board or flannel board. These boards use special material called Velcro which is constructed with miniature loops.

A hook and loop board. Three dimensional items can be displayed.



Other Velcro has miniature hooks and when you put the two kinds of Velcro together a strong (but removable) bond is created. You may be familiar with Velcro as the material which is used to hold the white headrest covers on the backs of airplane seats. It is also used to fasten parts of garments together.

6. Pegboard: Pegboard is a board with many holes arranged in a grid pattern. You can place various items with hook eyes on the pegboard and illustrate things in this manner. Pegboards are very seldom seen in areas other than elementary schools.

7. Chalkboards: You have all used the chalkboard and certainly much instruction has been given you by teachers using the chalkboard. It is a very quick way of transmitting information but its great disadvantage is that students usually have to wait while the instructor is writing on the chalkboard. Also, the instructor has his back to the students while he is working. For many educational applications it is probably more effective to use the overhead projector in place of the chalkboard. As you recall in an earlier module, we called the overhead projector an electronic blackboard. It provides two important advantages in that you can face your audience while you are writing on it, and there is very little glare--students sitting in all parts of the room can see equally well.

Why should an instructor go to the trouble of preparing an instructional display? After all, instructional displays can be very time-consuming to prepare effectively. They can't be left up too long or the message they are trying to communicate loses its impact. Many types of instructional displays are subject to tampering and vandalism. The question remains then, why take the time and effort? One reason is that student involvement in setting up displays may serve to help the student become more interested in the related subject matter. Displays can often be used as a means of getting reluctant learners involved in classroom activities. Also, displays stimulate and focus interest. They are particularly useful for this as a unit of instruction is being introduced. They are generally inexpensive to prepare and if done correctly, they need not be difficult to put together. Perhaps the most important reason for using instructional displays is that they establish an environment for learning. If you walk into an instructional area that has effective displays, it immediately establishes a climate for learning. On the other hand, if you walk into an instructional area with bare or poorly prepared bulletin boards, it conveys a lack of direction. Effective use of displays can often lead to more effective instruction and learning. It seems that one of the big problems in secondary schools, college, and adult education is that instructors do not spend enough time introducing material and creating an attractive environment for students. Somehow elementary teachers do a much better job along this line. They recognize the need for it. We don't think that this need is any less at the upper levels.

There are eight rules for effective displays:

1. A display should have a single unifying theme. You should avoid trying to give too many "messages". You should have one theme and illustrate it very well.

2. Use titles and captions. Avoid lengthy written materials. A display is no place to present a lot of information. Catchy titles and captions are fine, more than that causes a display to lose much of its effectiveness.

3. Avoid clutter--unless of course this is the effect you wish to achieve. Ordinarily, a display that is simple is much more effective. If you are in doubt, keep it as simple as possible. Take away information rather than adding more.

4. You should use connectors, such as arrows or lines, to show the relationship between various elements. Use them to show your learners how they are supposed to "read" the display.

5. Use contrasting colors, textures, shapes or size to achieve visual interest. This unit is too short to go into detail on this, but you should realize that different colors can create different moods. The same is true with texture, shape, and size. For really effective displays you should study the psychological effects of factors such as these.

6. Try to arrange objects to achieve symmetry and balance. This is extremely important in an effective display. People will tend to look and pay attention to a display that is balanced rather than a display that is obviously unbalanced.

7. Make sure that the lighting for your display is adequate. If people can't see the display, no matter how effective and how well executed it is, it is not going to cause a lot of interest. Certain kinds of lighting can be used to enhance a display. Good displays in shopping centers illustrate this point very well.

8. Be sure you remove the display as soon as its purpose has been achieved. Displays very quickly wear out their welcome and should be removed as soon as they have done the job. In fact, it is almost better to have a blank wall or a blank bulletin board than it is to have a display that has been up too many days.

Some Instructional Ideas with Print Media and Displays

1. Textbooks (or parts of them) can be used as teaching aids to present information.

2. Textbooks can be used in conjunction with non-print media (films, filmstrips, tapes) for increased interest.

3. Forms (such as an outline form) to indicate student responses (especially note taking) can be used with textbooks to individualize instruction (the forms can be different for different students).

4. Students can have access to more books if the books are paperback because they are less expensive than hardcover books.

5. Programmed instruction can be selected to teach specific skills and information without instructor help.

6. Programmed instruction can be used with students who are easily frustrated and have a greater need to succeed.

7. The construction of displays by students can serve as training in visual literacy.

8. Displays as constructed by students can provide practice in the ordering and sequencing of ideas.

9. Templates can be cut out of light plywood or cardboard to be used to draw certain shapes on the chalkboard.

10. Maps, graphs, or diagrams can be projected on the chalkboard using the opaque projector and the desired lines can be drawn on the chalkboard with chalk.

11. Jackets of books can be displayed on a bulletin board to encourage reading.

12. Bulletin boards which summarize a particular topic can be prepared by students--a good review activity.

13. A visual display can be used in a testing situation where things need to be contrasted, identified or related--and where evaluation of students would not be accurately reflected by paper and pencil tests.

14. Displays can be used by students to highlight an oral (or even a written) report.

SUMMARY

If print media and displays had just been "discovered", there is little doubt that they would be hailed as the panacea for education (just as many of the new items on the market now). In a way, we think it unfortunate that textbooks, journals, microforms, handouts, programmed instruction, and displays have been around a long time. Many instructors think of these things as "old hat" and tend to neglect them when they are designing learning activities. We feel that effective and appropriate use of print media and displays is one of the best ways to individualize instruction. They certainly are the most economical way to do this, and definitely ought to be considered when the needs of the learners and subject matter indicate their use.

Post-Test for Area 1

Directions: Circle the letter of the correct answer below.

1. Which of the following is not an advantage of books as instructional media?

   A. well suited to individualized instruction
   B. can present much information
   C. usually requires a high reading ability
   D. convenient to store and retrieve

2. Which of the following is not an advantage of periodicals as instructional media?

   A. many titles on many topics
   B. inexpensive
   C. deals with current topics--goes out of date quickly
   D. always up to date

3. Which of the following is not an advantage of microforms as instructional media?

   A. durable
   B. projectors are difficult and inconvenient to use
   C. inexpensive
   D. easy to store much information in little space

4. Which of the following is not an advantage of printed programmed instruction as instructional media?

   A. students might become bored with repetitive style
   B. divided into psychologically digestible steps
   C. inexpensive
   D. goal specific and performance oriented

5. Which of the following is not an advantage of photographs as instructional media?

   A. quickly produced
   B. inexpensive
   C. amateurish quality can hamper instructional effect
   D. easily produced

6. Which of the following is true of handouts as instructional media?

   A. quick to prepare
   B. inexpensive
   C. ideal for topical in-class materials
   D. all of the above
   E. none of the above

7. Which of the following is not one of the characteristics of spirit process duplication?

   A. one stencil produces less than 100 good copies
   B. image fades with time
   C. stencil only producible by typewriter
   D. quality of image ranges from acceptable to poor

8. Which of the following is not a characteristic of mimeograph process duplication?

   A. quality of images is from good to acceptable
   B. image is permanent (won't fade)
   C. one stencil produces about 100 copies
   D. stencil may be produced by typewriter or stylus

9. Which of the following is not one of the characteristics of offset process duplication?

   A. one stencil produces infinite number of copies
   B. untrained person can easily operate required equipment
   C. quality of image is excellent
   D. stencil can be cut by typewriter or photograph

10. Which of the following is not a characteristic of photocopy duplication?

    A. very inexpensive for many copies
    B. limited quality image
    C. quick (a direct copy) process
    D. useful when copy cannot be obtained quickly in any other way

11. Which of the following is not an advantage of instructional displays?

    A. stimulate student interest
    B. inexpensive and simple to prepare
    C. students like to tamper with displays
    D. establishes environment for learning

12. Which of the following is not a rule for good pictorial composition and presentation?

    A. use dim, even lighting so as not to distract from display
    B. use titles and captions
    C. use contrasting sizes
    D. use single rather than multiple themes

13. You are teaching business theory and you want your students to keep a log on the business conditions of the country. Which kind of printed medium below would you recommend?

A. soft cover books
B. hard cover books
C. periodicals
D. microform

14. You have selected an article from a journal which you want to share with a couple of students. Which duplication process would you use?

A. spirit duplication
B. mimeograph
C. photocopy
D. off-set

15. You are teaching in a large high school (over 2,000 students) and want to duplicate a series of poetry on the United States revolution. You want all the students to get a copy and you would like to reproduce this material four years hence. Which duplication procedure below would you choose?

A. spirit duplication
B. mimeograph
C. photocopy
D. off-set

16. You have an announcement about an upcoming event (which takes place in a week) that you want to prepare quickly for your class of 100 students. Which type of duplication below is most appropriate?

A. spirit duplication
B. photocopy duplication
C. mimeograph duplication
D. off-set

Post-Test Key

Question Number	Correct Response	Module Number	Area Number	Behavioral Objective#
1	C	6	1	1
2	C	6	1	2
3	B	6	1	3
4	A	6	1	4
5	C	6	1	5
6	D	6	1	6
7	C	6	1	8
8	C	6	1	9
9	B	6	1	10
10	A	6	1	11
11	C	6	1	13
12	A	6	1	14
13	C	6	1	7
14	C	6	1	12
15	D	6	1	12
16	A	6	1	12

To consider yourself competent in this MODULE (for Area 1), you should not have made more than two errors.

Pre-Test for Area 2
(Operation of the Standard Rocket Spirit Duplicator)

1. Set counter to zero
2. Attach master to drum
3. Adjust feed weight control
4. Load paper
5. Lower paper feed rollers
6. Check reservoir for fluid
7. Raise reservoir tank to operating position
8. Adjust catch pan for paper
9. Adjust pressure control for clear print
10. Run 1 or 2 copies
11. Remove master and lower fluid reservoir

How would you raise or lower the print on the finished copies?

Area 2--Behavioral Objectives for Operating the Standard Rocket Spirit Duplicator

1. On a given diagram, locate the items which provide the three following essentials to fluid duplication:

   A. carbon master
   B. fluid
   C. pressure on the carbon

2. On a given diagram, locate the following six important items in the fluid duplicator for handling paper stock:

   A. roller-drum
   B. roller-fluid applicator
   C. swing feed mechanism
   D. stripper pin blade
   E. sliding guides

3. Locate the following adjustment capabilities on a real or simulated Standard Rocket Fluid Duplicator:

   A. align master with paper stock
   B. raise and lower duplicated image on the paper stock
   C. adjust for catching various paper lengths
   D. adjust to various weights of paper stock
   E. adjust pressure to control clarity of duplication
   F. adjust the pressure for holding paper stock in place

4. Name the following six items of instruction for operating the Standard Rocket Fluid Duplicator:

   A. the master
   B. preparing the duplicator
   C. loading feed tray
   D. attaching master
   E. running copies
   F. leaving the duplicator

5. Select a multiple choice statement to explain that 5/16ths of an inch must be left on the feeding end of the master as the portion which fits into the master attaching slot of the duplicator.

6. Locate the 5/16ths of an inch on the feeding end of the History-6L master.

   A. place History-6L original on top of backing sheet for spirit master carbon and prepare a spirit master with the thermofax copy machine.

B. replace divider sheet in the spirit master carbon to protect the master

7. Use an instrument such as a pencil, ballpoint pen, or stylus to prepare a fluid duplicator carbon master listing the six items of instruction for operating a Standard Rocket Fluid Duplicator.

8. Locate on a real or simulated Standard Rocket Fluid Duplicator where the reservoir fluid level is checked and where the fluid supply is replenished. Position reservoir in vertical position for use.

9. Set the counter at zero.

10. Set the micromatic adjustment at zero.

11. Adjust pressure to three.

12. Set fed-weight adjustment at midpoint.

13. Select a multiple choice statement to explain that pressure is usually set at three but may be adjusted to vary the clarity and numbers of duplicated copies.

14. State that as the pressure is increased for clarity of print, the numbers of possible copies decreases.

15. Swing feed mechanism up out of the way.

16. Place the plain flexible stripper pin blade in vertical position when asked to select the correct blade for stripping cards.

17. Load the feed tray in the following manner:

    A. pivot bent stripper pin blade into vertical position for use with paper
    B. move rear sliding guide to extreme back position on tray
    C. place copy paper on tray with the front of stack against stripper pin and the side of the stack against the rear sliding guide
    D. push front sliding guide against paper to hold stack in position without binding

18. Slide the master stop pin to extreme rear to match the stack of paper stock.

19. Attach a master you have prepared to the duplicator drum in the following manner:

A. remove the master by tearing on the perforated line
B. position the operating handle at around six to seven o'clock to turn the master attaching slot into position
C. move master attaching lever to right toward receiving tray to open the master attaching slot
D. insert master into slot with the page line over the tip of the drum with the carbon on the upper side of the page. As the drum is turned, the master must follow the attaching slot counterclockwise.
E. slide the master toward the rear edge of the drum against the stop pin for proper alignment with the paper stock.
F. return the master attaching lever to closed position to lock master in place.

20. Run six copies of your master in the following manner:

A. with operating handle at starting position, lower feed mechanism onto paper stock
B. turn handle in clockwise direction
C. check the first copy to determine need for the following adjustments:
   (1) feed-weight adjustment
   (2) micromatic adjustment
   (3) pressure control
D. run six clearly readable copies of History-6L

21. Prepare for leaving the duplicator in the following manner:

A. remove paper stock from feed tray
B. move master attaching lever to right toward receiving tray to open the master attaching slot and remove the master
C. fold master with carbon inside and discard in wastebasket
D. lower fluid reservoir to allow fluid drainage from wick tank
E. state that fluid is drained from wick tank when duplicator is not in use to prevent evaporation of fluid

22. Following the correct operating procedure, use the Standard Rocket Fluid Duplicator to prepare six copies of "Six Items of Instruction for Operating the Standard Rocket Fluid Duplicator" from the fluid duplicator carbon master.

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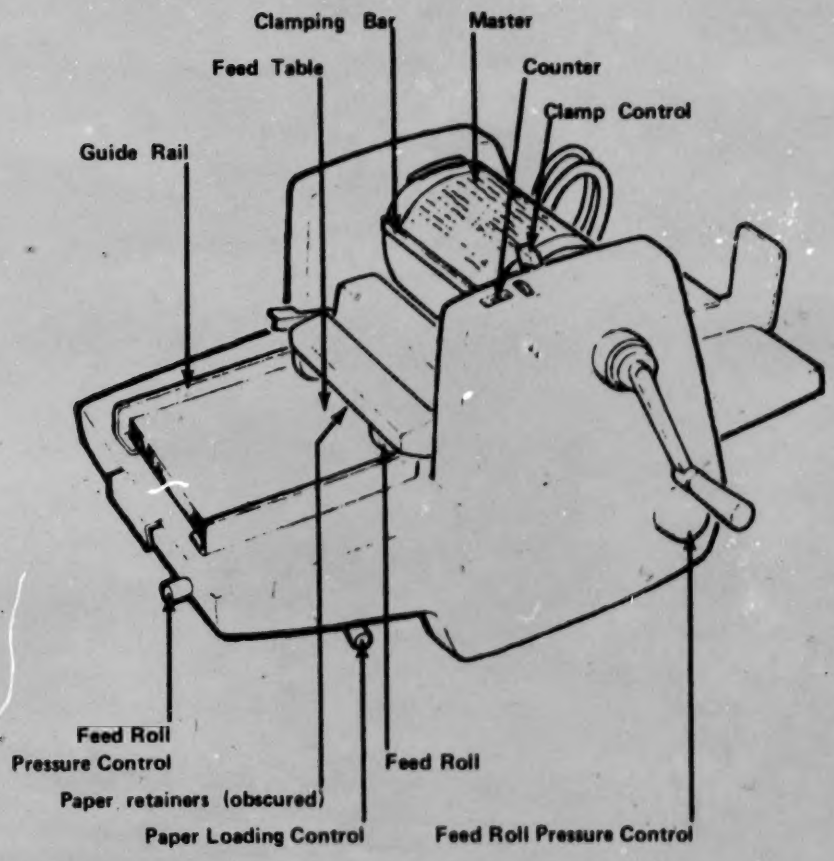
Illustration (with components labeled)
of a Spirit Duplicating Machine



MODULE #5--INSTRUCTIONAL MATERIALS SELECTION TECHNIQUE

(Simulation Exercise)

Introduction

One of the problems inherent in using instructional materials is that it is so easy to get involved with the machines themselves (fascinating as they are) and to lose sight of the fact that these machines are only a means to an end--an instructional end! It is so easy to get carried away with the "hardware" and to neglect the "software"--that is, the information and subject matter content delivered by these machines. Indeed, it is possible-and quite often the case--that instructors learn to use and operate all the media equipment without learning what films, projectuals, tapes, programs, et cetera are available for them to use with this equipment.

When you finish this module, you should be competent in locating instructional materials in your instructional field by using special catalogs, indexes, directories, guides and so on. You should also know the sources of instructional materials which are most useful in providing specific information relating to such things as cost, media, instructional method, and instructional level. The following procedure has been designed to help you achieve these competencies in this simulation exercise.

Recommended Procedure You Should Follow

1. Take the Pre-test which begins on p. 241 to determine what you already know about selecting instructional materials. Use the key following the test (p. 243) to see how you fared.

2. If the Pre-test reveals that you need additional study, look at the Behavioral Objectives which begin on p. 245 of this MODULE. You should fill in the objectives (solve for them) as you proceed to do the simulation exercise itself. Doing and handing in the simulation exercise is a requirement of the course. It is graded either full credit or no credit. Also, there are some items on the regular test which relate to this module.

3. The Simulation Exercise (p. 249) must be completed in the IMC in Ronan Hall on CMU's campus or by using the materials in packet #14. If you use the IMC, you will find out that there is a special section which contains the materials you need to complete the simulation exercise.

4. After you have located the material in the Instructional Materials Center or in Packet #14 you are ready to proceed to do the Simulation Exercise and at the same time complete the Behavioral Objectives. You will note that there are 2 copies of the Simulation Exercise. They are exactly the same except one is marked "Instructor's Copy" (p. 245) and the other is marked "Student's Copy" (p. 253). Use the "Student's Copy" as your scratch paper and transfer the information you gather to the "Instructor's Copy" which you must type and then send or hand in. As mentioned before, be sure you examine the Behavioral Objectives beginning on p. 241 as you do the Simulation Exercise.

5. After you've completed the Simulation Exercise, take the Post-test (which begins on p. 257) to see how well prepared you are in selecting instructional materials. Note the objective numbers which preceed the correct answer in the answer key (p. 259) following the Post-test. They will refer you directly to objectives with which you still may be having trouble.

Selected Readings

	Pages
Brown, James W., Richard B. Lewis and Fred F. Harcleroad, AV Instruction: Technology, Media and Methods, 4th Edition, McGraw-Hill, 1973.	43-48 375-400 549-572
Minor, Ed and Harvey R. Frye, Techniques for Producing Visual Instructional Media, McGraw-Hill, 1970.	234-254
Wittich, Walter Arno and Charles Francis Schuller, Instructional Technology: Its Nature and Use, 5th Edition, Harper and Row, 1973.	47-74 687-714
Kemp, Jerrold E., Planning and Producing Audiovisual Materials, 2nd Edition, Chandler, 1968.	238-242
Gerlach, Vernon S. and Donald P. Ely, A Systematic Approach, Prentice-Hall, 1971.	323-324 329-330 337-339 341-342 350-353 359-360 363-364 374-375 383-384 390-391

MATERIALS SELECTION TECHNIQUE

Pre-Test

Directions: Circle the letter of the correct answer below.

1. When consulting sources for media, which sources, ideally, should be consulted as a last step?

   A. Salesman
   B. Indexes (directories)
   C. Professional journals
   D. Company catalogs

2. Which one of the major indexes (directories) listed below is the most comprehensive in terms of equipment listed?

   A. Hendershot's Bibliography of Programmed Instruction
   B. AV Source Directory
   C. Audio-Visual Equipment Directory
   D. EL-HI Textbooks in Print

3. Which statement below IS NOT a characteristic of EFLA (Educational Film Library Service)?

   A. Provides a critique of the film
   B. Provides a description of the film
   C. Provides data about the film and its producer
   D. Provides an index to films according to subject area

4. Why should source indexes (directories) be consulted first when one is ascertaining what materials are available in the field in which he is teaching?

   A. Indexes are most likely to list the greatest variety of materials
   B. Indexes list everything in the field
   C. Indexes provide the most information about each particular material
   D. None of the above
   E. All of the above

5. Which of the following is true concerning the data provided in the Educator's Progress Service series of Indexes to Free Materials?

   A. Comprehensive (different types of media and most subject areas)
   B. Evaluation of materials provided

C. Dates materials produced provided
D. All of the above
E. None of the above

6. In terms of sources of materials, where are you most likely to get a quick and good overview of the very LATEST in media for the subject area in which you are teaching?

A. Indexes of Media
B. Media Company catalogs and brochures
C. Encyclopedias
D. None of the above
E. All of the above

7. Which statement below best describes the availability of journals in one subject field?

A. They are available in most subject fields
B. They are available in some subject fields
C. They are available only in the most prominent subject fields
D. They simply aren't available in any subject field

8. An advantage to using company representatives as a source for information about instructional materials is that:

A. he might be able to provide actual samples
B. he might be able to provide consultant help
C. he might know of some special pricing "break"
D. None of the above
E. All of the above

Pre-Test Key

Question Number	Correct Response	Module Number	Behavioral Objective#
1	A	7	1
2	C	7	2
3	D	7	2
4	A	7	3 & 4
5	A	7	6 & 7
6	B	7	8
7	A	7	9 & 10
8	E	7	11

To consider yourself competent in this module, you should not have made more than one error.

INSTRUCTIONAL MATERIALS SELECTION TECHNIQUE

Behavioral Objectives

The learner will be able to:

1. identify statements which specify the steps for consulting sources as he or she is looking for materials in a particular subject area.

2. identify the distinguishing features of each of the six major indexes (format and type of media featured by each)

3. identify the most important reason for consulting the indexes <u>first</u> in searching for materials.

4. identify the two major weaknesses of most of the indexes.

5. locate material (except for E, F, & G - on these just look the material over, realizing that these items exist and can be used for selecting materials) for his major or minor in the following indexes or other publications:

   A. EL-HI TEXTBOOKS IN PRINT
   B. NICEM DIRECTORIES
   C. HENDERSHOT'S BIBLIOGRAPHY OF PROGRAMMED INSTRUCTION
   D. EDUCATOR'S GUIDE TO FREE MATERIALS (EDUCATORS PROGRESS SERVICE)
   E. CATALOGS AND BROCHURES
   F. JOURNALS (in each subject field)
   G. EPIE REPORT, CURRICULUM ADVISORY SERVICE AND PREVIEWS

6. identify the three major sources for free and inexpensive materials.

7. identify a major weakness in the EDUCATOR"S GUIDE TO FREE MATERIALS.

8. identify two advantages in using company catalogs and brochures

9. identify two features of journals in one's subject field which make them valuable for selecting media.

10. identify the three journals which are devoted almost exclusively for user reports and critiques.

11. identify at least five services that company representatives can provide when you are selecting materials.

Instructor's Copy: Hand in this copy TYPED!

Simulation Exercise for Instructional Materials Selection Technique

Student Name_____

Student Address_____

Date_____

1. The first step in a materials selection procedure would be to consult the various indexes. This is because the indexes are very complete as to the broad range of materials available for each of the subject areas. Locate and examine the following materials that we classify as Indexes (use the copies that we include in Packet #14 or the latest copies available in the IMC if you are doing this on campus):

   -NICEM (National Information Center for Educational Media) INDEXES. A sample of one of these is included in Packet #14. You should realize that this is just one of a series of volumes in the NICEM collection. There are 14 in all covering the following kinds of media: transparencies, 16mm film, filmstrips, videotapes, audiotapes, records 8mm, slides, producers and distributors, black history, ecology, health and safety, vocational and technical, and psychology.

   -HENDERSHOT'S BIBLIOGRAPHY OF PROGRAMMED LEARNING. This is found in a brown loose-leaf binder in the packet.

   -EL-HI TEXTBOOKS IN PRINT. These are bound books which come out yearly. Use the sample included in the packet.

   -AUDIO-VISUAL EQUIPMENT DIRECTORY. Use the sample included in the packet.

   -EFLA 16mm FILM INDEX. Samples of these 3 x 5 cards are reproduced on 8 1/2 x 11 paper and are found in the manilla envelope marked "EFLA 16mm Film Index."

   A. Which one of the 5 INDEXES would you look in to find an audio tape that included a 2 or 3 sentence review of that tape?_____

B. Which one of the 5 INDEXES would you search if you were looking for a cassette audio-tape recorder to purchase? _____

C. Which one of the 5 INDEXES not only gives you a rather complete description of the media but also gives an evaluation or critique? _____

D. Which INDEX (taken as a whole) appears to describe the most media but gives only the most condensed information about each item described? _____

E. Using EL-HI TEXTBOOKS IN PRINT, find a textbook in your area and describe it (title, author, company, grade level, price). Do not do this one if your subject area is outside the area of pre K-12th grade. _____

F. Using a NICEM INDEX, find an item which would correlate with a unit in the textbook you chose in (E) above. Describe it (title, company, grade level). Note that price isn't given, a real disadvantage. _____

G. Using HENDERSHOT'S BIBLIOGRAPHY OF PROGRAMMED INSTRUCTION, find and describe (title, company, price, grade level) programmed instruction which would deal as closely as possible with the subject matter dealt with by the textbook you selected in (E) above. _____

2. A second step would be to determine if any free materials might be available in your area, keeping in mind that free materials are free only because the sponsor has a "message" to get across. Federal and state government agencies are often very good sources for catalogs on free and inexpensive materials for classroom use. So too are many of the large corporations (like GM, Proctor and Gamble, Michigan Bell Telephone, etc.) and professional organizations (like AMA, AFL-CIO, NEA, etc.). A publication which you will find very useful in locating relevant materials in your subject area are the EDUCATOR'S GUIDE TO FREE MATERIALS, sometimes called EDUCATOR'S PROGRESS SERVICE (eight separate volumes in green loose-leaf notebooks.)

   A. In the volume that is included in Packet #14 (if you are doing this on campus, use the complete set which is available in the IMC), locate some free material which correlates as closely as possible with subject matter covered in the textbook you selected earlier. Describe the material as to type, title, and name of agency giving away the material.

   B. In looking through the various free materials, can you find dates as to when the material was printed or published?

3. A third step in locating relevant materials would be to consult media company catalogs and brochures in your subject area. Since INDEXES are always out-of-date because of lead time needed in printing and distributing, media company catalogs and brochures are likely to describe the most current media available. You will find a few of these catalogs in the manilla folder marked "Company Catalogs and Brochures." If you are doing this on campus, we have six five-drawer files filled with up-to-date company catalogs and brochures in the IMC. Use these instead of the ones in the manila folder.

   A. In your subject area, select what you consider a worthwhile and unique item in a brochure and describe it (type of media, company, and price.)

B. As a general rule, in which kind of source (the indexes or the media company catalogs and brochures) are you likely to find the most information about a given product? _____

4. A fourth step in selecting media would be to look through journals available in your subject area for advertisements and especially for user reports. Oftentimes, a journal will have as a monthly feature an article dealing with someone who has field tested a particular kind of media. Another feature of most journals is a "what's new in the field" section. These are generally capsule comments about new products with no critique provided. The IMC and most school systems and professional organizations have journals for most subject areas.

   Three special journals are available in which their only purpose is to feature user reports and critiques about media in the various subject fields. These are the EPIE REPORT, the CURRICULUM ADVISORY SERVICE journal and the PREVIEWS journal. A copy of each of these is included with Packet #14 in a manila enveloped marked "Special Journals".

5. Once the potential purchaser has completed the above steps in selecting materials, he or she has probably narrowed the field to just a few items. Now is the time to consult salesmen who represent the company whose product(s) you are interested in examining further. The salesman will be able to provide you with sample copies of the material, special pricing he or she may be able to offer, information as to how to order and the time interval required from the time you order and when you get the material, and schools or companies in your area which may already be using the materials you desire. He may also provide pointers as to how best to use his materials and even provide you with a consultant to teach sample lessons in your class.

Student's Copy: Use this sheet for doing the initial search

Simulation Exercise for Instructional Materials Selection Technique

Student Name_____

Student Address_____

Date_____

1. The first step in a materials selection procedure would be to consult the various indexes. This is because the indexes are very complete as to the broad range of materials available for each of the subject areas. Locate and examine the following materials that we classify as Indexes (use the copies that we include in Packet #14 or the latest copies available in the IMC if you are doing this on campus):

   -NICEM (National Information Center for Educational Media) INDEXES. A sample of one of these is included in Packet #14. You should realize that this is just one of a series of volumes in the NICEM collection. There are 14 in all covering the following kinds of media: transparencies, 16mm film, filmstrips, videotapes, audiotapes, records 8mm, slides, producers and distributors, black history, ecology, health and safety, vocational and technical, and psychology.

   -HENDERSHOT'S BIBLIOGRAPHY OF PROGRAMMED LEARNING. This is found in a brown loose-leaf binder in the packet.

   -EL-HI TEXTBOOKS IN PRINT. These are bound books which come out yearly. Use the sample included in the packet.

   -AUDIO-VISUAL EQUIPMENT DIRECTORY. Use the sample included in the packet.

   -EFLA 16mm FILM INDEX. Samples of these 3 x 5 cards are reproduced on 8 1/2 x 11 paper and are found in the manilla envelope marked "EFLA 16mm Film Index."

   A. Which one of the 5 INDEXES would you look in to find an audio tape that included a 2 or 3 sentence review of that tape?_____

B. Which one of the 5 INDEXES would you search if you were looking for a cassette audio-tape recorder to purchase? _____

C. Which one of the 5 INDEXES not only gives you a rather complete description of the media but also gives an evaluation or critique? _____

D. Which INDEX (taken as a whole) appears to describe the most media but gives only the most condensed information about each item described? _____

E. Using EL-HI TEXTBOOKS IN PRINT, find a textbook in your area and describe it (title, author, company, grade level, price). Do not do this one if your subject area is outside the area of pre K-12th grade. _____

F. Using a NICEM INDEX, find an item which would correlate with a unit in the textbook you chose in (E) above. Describe it (title, company, grade level). Note that price isn't given, a real disadvantage. _____

G. Using HENDERSHOT'S BIBLIOGRAPHY OF PROGRAMMED INSTRUCTION, find and describe (title, company, price, grade level) programmed instruction which would deal as closely as possible with the subject matter dealt with by the textbook you selected in (E) above. _____

2. A second step would be to determine if any free materials might be available in your area, keeping in mind that free materials are free only because the sponsor has a "message" to get across. Federal and state government agencies are often very good sources for catalogs on free and inexpensive materials for classroom use. So too are many of the large corporations (like GM, Proctor and Gamble, Michigan Bell Telephone, etc.) and professional organizations (like AMA, AFL-CIO, NEA, etc.). A publication which you will find very useful in locating relevant materials in your subject area are the EDUCATOR'S GUIDE TO FREE MATERIALS, sometimes called EDUCATOR'S PROGRESS SERVICE (eight separate volumes in green loose-leaf notebooks.)

   A. In the volume that is included in Packet #14 (if you are doing this on campus, use the complete set which is available in the IMC), locate some free material which correlates as closely as possible with subject matter covered in the textbook you selected earlier. Describe the material as to type, title, and name of agency giving away the material.

   B. In looking through the various free materials, can you find <u>dates</u> as to when the material was printed or published?

3. A third step in locating relevant materials would be to consult media company catalogs and brochures in your subject area. Since INDEXES are always out-of-date because of lead time needed in printing and distributing, media company catalogs and brochures are likely to describe the most <u>current</u> media available. You will find a few of these catalogs in the manilla folder marked "Company Catalogs and Brochures." If you are doing this on campus, we have six five-drawer files filled with up-to-date company catalogs and brochures in the IMC. Use these instead of the ones in the manila folder.

   A. In your subject area, select what you consider a worthwhile and unique item in a brochure and describe it (type of media, company, and price.)

B. As a general rule, in which kind of source (the indexes or the media company catalogs and brochures) are you likely to find the most information about a given product?

_____
_____
_____
_____
_____
_____
_____

4. A fourth step in selecting media would be to look through journals available in your subject area for advertisements and especially for user reports. Oftentimes, a journal will have as a monthly feature an article dealing with someone who has field tested a particular kind of media. Another feature of most journals is a "what's new in the field" section. These are generally capsule comments about new products with no critique provided. The IMC and most school systems and professional organizations have journals for most subject areas.

   Three special journals are available in which their only purpose is to feature user reports and critiques about media in the various subject fields. These are the EPIE REPORT, the CURRICULUM ADVISORY SERVICE journal and the PREVIEWS journal. A copy of each of these is included with Packet #14 in a manila enveloped marked "Special Journals".

5. Once the potential purchaser has completed the above steps in selecting materials, he or she has probably narrowed the field to just a few items. Now is the time to consult salesmen who represent the company whose product(s) you are interested in examining further. The salesman will be able to provide you with sample copies of the material, special pricing he or she may be able to offer, information as to how to order and the time interval required from the time you order and when you get the material, and schools or companies in your area which may already be using the materials you desire. He may also provide pointers as to how best to use his materials and even provide you with a consultant to teach sample lessons in your class.

Post-Test

Directions: Circle the letter of the correct answer below.

1. There is a five step procedure for selecting media for your subject area. In random order they are: (a) Talking to salesmen, (b) Looking at Guides to free material, (c) Looking at indexes, (d) Looking through journals, (e) Looking at company catalogs. Which combination below is the ideal order in which to locate relevant materials?

   A. c, b, e, d, a
   B. e, c, d, b, a
   C. c, d, a, e, b
   D. e, a, b, c, d
   E. a, b, c, d, e

2. Probably the MOST comprehensive index for all types of media software is the

   A. Audio-Visual Equipment Directory
   B. Hendershot's Bibliography of Programmed Materials and Devices
   C. El-Hi Textbooks in Print
   D. NICEM Directories

3. Which statement below is a distinct disadvantage when using indexes (or directories) in locating material.

   A. Lack of currency (dated)
   B. Systematically organized
   C. Comprehensive
   D. All of the above
   E. None of the above

4. Most media source indexes (directories) have as a major weakness the fact that:

   A. They are dated (not current)
   B. They do not provide a lot of information about each product
   C. Both of the above
   D. Neither of the above

5. If you wanted to get materials such as films, filmstrips and tapes for your class <u>free</u>, you should contact

   A. large companies
   B. Federal Government Agencies
   C. State Government Agencies
   D. professional organizations, e.g., American Medical Association
   E. All of the above

6. Company catalogs and brochures are:

   A. found in virtually all subject areas
   B. found only in the prominent areas such as math, science, English, and reading.
   C. simply not readily available and if they are, they are very old

7. What would be a good reason for <u>not</u> relying exclusively on journals when selecting materials?

   A. They contain no advertising
   B. They do not have user reports
   C. They do not feature the latest media in various subject fields
   D. They are not comprehensive, i.e. they do not contain everything that is available to you.

8. Why should the salesman be the last source to consult when selecting instructional materials?

   A. He really doesn't know too much about his materials
   B. He is biased and is mainly interested in selling you <u>his</u> materials
   C. Salesmen don't like to talk with instructors
   D. He can't provide you any services

Post-Test Key

Question Number	Correct Response	Module Number	Behavioral Objective
1	A	7	1
2	D	7	2
3	A	7	2
4	C	7	3 & 4
5	E	7	6 & 7
6	A	7	8
7	D	7	9 & 10
8	B	7	11

To consider yourself competent in this module, you should not have made more than one error.

MODULE #6--SELECTING THE APPROPRIATE MEDIA

Introduction

Someone has jokingly (?) suggested that there are two kinds of instructors: those who use media and those who don't. The implication of such a remark is that instructors who do not use media are less than professional or in some way inferior. Nothing could be further from the truth. In the first place, every instructor who uses a textbook, a chalkboard, or pencil and paper is using media. But the observation that some instructors use a particular media while others do not is a valid observation, and it raises an interesting question: When do you use particular media? When is the use of a slide projector, for example, more appropriate than a motion picture projector?

Every media type has its own peculiar instructional characteristics which make it appropriate in a given instructional situation. In fact, you already know many of the characteristics from your study of previous modules. This module is designed to supplement those characteristics and to analyze any given learning situation so that you, as an instructor, can make valid choices and decisions in the selection and use of media. To achieve these competencies, the following procedure has been designed.

Recommended Procedure You Should Follow

1. Note the Areas below and where various aspects of them are located in this module:

Areas	Behavioral Objectives	Type of Instruction	How Tested
1. Factors to consider in Media Selection	p. 273	Monograph (p. 275)	Test
2. Principles and Practices of Instructional Technology, #1 through #5	p. 287	Audio-slide (SISC) 340-0292 thru 340-0296 or Packet #15	Test
3. Exercise on selecting appropriate media	p. 311	Instructions (p. 313)	Hand in exercise

2. Take the Pre-Test which begins on page 265 to determine what you already know in this MODULE. Use the key following the test (p. 271) to see how you fared. Note that the answer key also gives the Area # and the behavioral objective number.

3. If the Pre-Test reveals that you need additional study in Areas 1 or 2 or both, study the Behavioral Objectives for these areas. For Area 1 the objectives begin on p. 273 and for Area 2 they begin on pages 284. Work through the instruction that is offered (Area 1 is handled by a monograph which begins on p. 275 of this module, while Area 2 is taught by audio/filmstrip programs 340-0292 through 340-0296 which are in Packet #15 or if you come to campus, are available at the Self Instructional Systems Center. Use the "involvement forms" which begins on p. 291 for these audio-filmstrip programs. This will help you understand much better the behavioral objectives for Area 2. Note that space has been provided after each behavioral objective so that you can take notes while studying the instruction.

4. To see how well you are prepared in Areas 1 and 2 after instruction, take the Post-Test which begins on p. 315. Note the objective numbers which preceed the correct answer in the answer key following the Post-Test. They will refer you directly to objectives with which you may still be having trouble.

5. Area 3 is basically an exercise to have you apply to your subject area what you have learned in this course. The instructions for the preparation of this exercise are found beginning on p. 313. However, just prior to the instructions are the behavioral objectives for this assignment (pg. 311-312). You should read them first. You will note that they are in the form of a check sheet (that is, each objective is rated with points so that they can be used for grading purposes). Since this exercise accounts for 1/3 of your grade in this class, you should read the behavioral objectives and monograph very carefully to see that you do exactly as the behavioral objectives indicate.

Selected Readings

	Pages
Brown, James W., Richard B. Lewis and Fred F. Harcleroad, AV Instruction: Technology, Media and Methods, 4th Edition, McGraw-Hill, 1969.	1-28
Dale, Edgar, Audiovisual Methods in Teaching, 3rd Edition, Dryden Press, 1969.	105-135 139-160 159-185 508
Mager, Robert F., Preparing Instructional Objectives, Fearon Publishers, 1962.	All pages
Gerlach, Vernon S. and Donald P. Ely, A Systematic Approach, Prentice-Hall, 1971.	73-75 279-302 123-124 141-144 155-157 168 195-196
Davis, Robert H., Lawrence T. Alexander and Stephen L. Yelon, Learning System Design, McGraw-Hill, 1974.	All pages
Wittich, Walter Arno and Charles Francis Schuller, Instructional Technology: Its Nature and Use, 5th Edition, Harper and Row, 1973.	600-625

Pre-Test

Directions: Circle the letter of the correct answer below.

1. Identify the choice that is not a media determination factor:

   A. Cost
   B. Learner characteristics
   C. Level of abstraction
   D. Verbal symbols

2. Identify the name of a major domain of educational objectives:

   A. Knowledge
   B. Cognitive
   C. Intuition
   D. None of the above

3. Questions regarding smell, tactile manipulation, sound and color should be asked as an aid in:

   A. Determining curriculum
   B. Selecting Media
   C. Priorities in instruction
   D. None of the above

4. Identify the most concrete experience below:

   A. Exhibits
   B. Verbal symbols
   C. Simulation
   D. Visual symbols

5. Which of the following is not a way of compensating for individual learner differences?

   A. Student pacing
   B. Intelligence tests
   C. Alternative strategies
   D. All of the above

6. The number of students, time, space and distance factors all have an effect on:

   A. The cognitive level
   B. The educational domain
   C. Media selection
   D. All of the above

7. A cost factor that must be considered when media is selected is:

   A. Cost should not be a factor
   B. Most media are so expensive they are not really useful
   C. What is the cost of not accomplishing the objective
   D. All of the above

8. One of the following is not one of the three components upon which instructional technology is based

   A. interactive instruction
   B. entry performance requirements
   C. behavioral objectives
   D. validation

9. Which of the following is a behavioral objective statement?

   A. Write the name of two Beethoven symphonies.
   B. Understand the principle of thermal expansion and contraction.
   C. Know the particle theory of gravity.
   D. Appreciate contemporary paintings.

10. Which of the following are educational goal statements?

   A. The learner will recite Poe's "The Raven".
   B. The learner will understand the addition of fractions.
   C. The learner will shoot and make 5 free throws out of 10 attempts.
   D. The learner will spell any of the 50 states correctly.

11. The purpose of behavioral objectives is to

   A. describe learning in terms of observable student performance
   B. make classification of cognitive performance "visible"
   C. focus upon teacher behavior
   D. make learners "accountable"

12. One of the primary advantages of "interactive instruction" is

   A. it keeps the student busy in a productive way
   B. it makes the student think analytically
   C. it is a problem-solving approach
   D. it enables the student to determine his own progress

13. Which of the following statements best explains the validation process?

A. write objectives and write criterion test items
B. pre-test - instruct - post-test
C. write goals - write terminal objectives - write interim objectives
D. test - revise

14. The validation of interactive instruction is made relatively easier than instruction which is not interactive because

A. it is easy to judge from a student's behavior whether he is "getting it" or not
B. it is based upon cycles of testing and revision
C. it is based upon criterion test items
D. a student cannot behave in a wrong way

15. Which statement best describes the required terms used in stating behavioral objectives?

A. performance goals
B. visible behaviors
C. covert responses
D. performance contract

16. Which of the following best describes an affective behavior?

A. a voluntary response showing attitudes or feelings
B. the way a student "acts"
C. what a student likes or "approaches"
D. statements of things that are "good" for the student

17. Which one of the following is an affective objective?

A. the student will type at 80 wpm
B. the student will understand Boyle's law
C. the student will seek out more information about Archaeology
D. the student will explain Brownian movement
E. the student will write a research paper on TV documentaries

18. Which of the following statements best explains the concept of behavioral terms?

A. terms which signal the visible and internal conditions
B. human actions which are observable (visible) by others
C. active verbs
D. performance terms
E. terms which specify all forms of human activity

19. Which of the following behavioral objectives has the conditions underlined?

A. Given a faulty carburetor, the student will re-build it.
B. The student will name all tenses of French verbs.
C. The student will disect the heart from a frog.
D. Given resistance and current, the student will compute the voltage.
E. Given a map of the world, the student will point to and name the continents.

20. Which of the following statements is adequate as a behavioral objective?

A. A student will know the different types of threads.
B. A student will spell correctly all words from the following list.
C. A student will like to read.
D. Given a faulty circuit, a student will identify the problem.
E. A student will be able to swim a long distance freestyle.

21. What is the classification of this objective? The student will explain the Fifth Amendment.

A. motor
B. verbal
C. discrimination
D. motor-verbal
E. verbal-discrimination

22. What is the classification of this objective? Given a model, the student will make a scale drawing showing front, side, and top views.

A. motor
B. verbal
D. discrimination
D. discrimination-motor
E. discrimination-verbal

23. An objective which is long and complex should be

A. re-written as a series of intermediate or "interim" objectives.
B. left "as is". Objectives can be long and complex.
C. re-phrased. Statements of that type can always be simplified.
D. re-examined

24. A subobjective is

A. a terminal objective
B. an interim objective
C. an objective not yet stated in behavioral terms
D. a step or component of a larger objective

25. Which of the following interim objectives might be critical for completion of this terminal objective: The student will sew on a button.

A. The student will know how to sew on different types of buttons.
B. The student will thread the needle.
C. The student will attach various types of fasteners.
D. The student will describe the difference between cotton and nylon thread.

26. Which of the following is a primary function of criterion tests:

A. The criterion test helps determine students' ability to perform course requirements.
B. The criterion test makes it easy to specify multiple choice items.
C. The criterion test aids retention of memorized materials.
D. The criterion test makes it easier for students to gain competency faster.

27. What class of behavior does this test item require?

A. motor
B. verbal
C. discrimination

28. Which media selection should you make below--assume that all forms of media below will accomplish your objectives equally well?

A. a textbook
B. a computerized learning system
C. a audio-slide program
D. a 16mm film

29. You have a group of students in a math class. You are working on a unit in ratios and you consider this material to be an absolute must for all students to learn. At this point you are much more concerned with effective rather than efficient learning. Which medium below should you select?

A. a lecture by a noted mathematician dealing with the need to know ratios

B. direct experience on a chemistry problem all the students must solve
C. a filmstrip with an audio tape
D. a motion picture in black and white

30. Students in your art class have trouble in various degrees with blending the primary colors to get certain shades. You want to teach these concepts in an efficient, yet inexpensive manner. What media below should you select?

A. audio tapes
B. programmed instruction
C. slides
D. 16mm films

31. You are teaching beginning sewing. What kind of medium below should you insist upon as a must in order for students to accomplish the objectives.

A. equipment upon which the students will practice
B. printed or visual media which will allow the students to self-pace themselves and which will take into account different learning styles
C. a simulated seamstress' shop
D. media which will allow tactile manipulation

32. You are teaching speech to a group of sales trainers. Which type of medium below would be a high priority item for you?

A. media featuring an olfactory component
B. media featuring an audio component
C. written media
D. media featuring color slides that can be controlled by the learner

Question Number	Correct Response	Module Number	Area Number	Behavioral Objective
1	D	8	1	1
2	B	8	1	2
3	B	8	1	3
4	C	8	1	4
5	B	8	1	5
6	C	8	1	6
7	C	8	1	7
8	B	8	2	1
9	A	8	2	2
10	B	8	2	3
11	A	8	2	4
12	D	8	2	5
13	D	8	2	6
14	A	8	2	7
15	B	8	2	8
16	A	8	2	9
17	C	8	2	10
18	B	8	2	11
19	E	8	2	12
20	B	8	2	13
21	B	8	2	14
22	D	8	2	15
23	A	8	2	16
24	D	8	2	17
25	B	8	2	18
26	A	8	2	19
27	B	8	2	20
28	A	8	1	8
29	B	8	1	9
30	C	8	1	9
31	A	8	1	9
32	B	8	1	9

To consider yourself competent in this Module (for areas 1 and 2) you should not have made more than 3 errors.

Area 1--Factors to Consider in Media Selection-Behavioral Objectives

If educational media is going to be of value to you as a teacher, you will have to be able to make the best selection possible under the circumstances you find yourself.

GOAL: The preservice teacher will be able to identify the various factors that should be considered when selecting media.

1. The student will be able to identify five major factors that determine the media or medium that will be used in an instructional situation.

   A.
   B.
   C.
   D.
   E.

2. The student will be able to identify the three domains in which objectives may be classified as an aid to media selection.

   A.
   B.
   C.

3. The student will list six questions whose answers will aid in the determination of media.

   A.
   B.
   C.
   D.
   E.
   F.

4. The student will be able to rank the following in order from the most concrete (1) to the most abstract (7). They should be listed in this order:

   ___ Motion pictures
   ___ Direct experience
   ___ Visual symbols
   ___ Exhibits (models, cutaways, etc.)
   ___ Verbal symbols
   ___ Simulation
   ___ Still pictures

5. The student will be able to list four ways of compensating for individual learner characteristics.

   A.
   B.
   C.
   D.

6. The student will be able to identify three physical constraints that may in part determine the instructional media.

   A.
   B.
   C.

7. The student will be able to identify two cost factors to be considered when selecting media:

   A.
   B.

8. The student will be able to identify and use 6 "rules of thumb" when selecting media.

   A.
   B.
   C.
   D.
   E.
   F.

9. Using the above factors (in behavioral objectives 1 through 8 preceeding) as applied to various hypothetical learning situations, the student will be able to select the appropriate media to match the situation.

Area 1--Factors to Consider in Media Selection--Monograph

This is the last module in this course. It will provide you with a background which will aid you in selecting the kinds of media that will most appropriately serve your needs in the instructional context.

We feel that media are more often misused than used correctly. In fact, much research shows that instruction with media presentations is not a great deal more effective than instruction without them. Now, if this is the case, why are we concerned with using media at all in the teaching context? The reason for this is that other research shows that when media is used effectively, that is, when the students and the characteristics of media and the instructional objectives are matched, it can be very effective. Therefore, the goal of this module is to enable you to identify factors in addition to those already discussed in previous modules that should be considered when selecting media.

Before we get into the body of this module, we would like to illustrate what can be done with the effective use of media. Probably the best way to do this would be to take a look at the solution of one of the training problems that industry has had to face. Specifically, we refer to the 747 "jumbo jet" pilot training program developed by the Boeing Company (the plane's manufacturer) and United Airlines. Heretofore most companies, United Airlines included, trained their pilots on new planes by simply checking the pilot out, (that is, having him fly with a co-pilot already an expert) on the new plane at a special training airport. Because of the obvious expense of such a system, not to mention the built-in potential for a major catastrophe, United Airlines decided to use a learning systems approach to do the training of pilots for the 747. What we mean by a learning systems approach is that the whole situation was analyzed to see how the training could be accomplished the most effectively with the greatest economy. Very specific methods were used to determine objectives. Then media were matched to those objectives to achieve the greatest economies and the greatest skill on the part of the pilots to be trained. After all, you can't train someone too well when his ultimate responsibility is to fly an aircraft containing over 400 passengers!

It took thirty-two months just to analyze the problem and to come up with some seventeen hundred objectives. Then the designers had to distinguish between those objectives that were critical and those that were irrelevant. At this point they decided to use a continuous progress evaluation which involved the use of a small sample of the pilots to be trained. Pilots were checked at each critical point on the way so that the trainers were absolutely

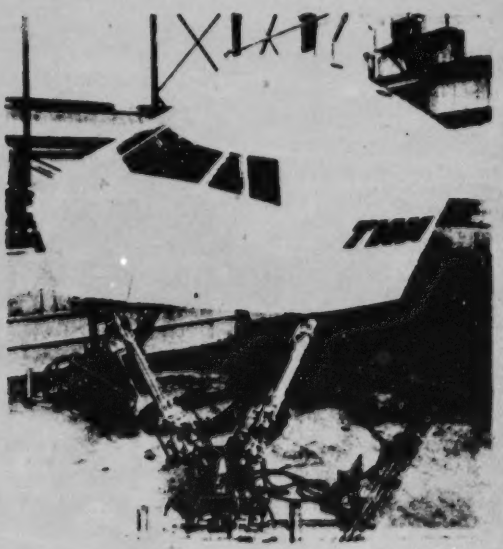
sure that the pilots did not miss anything before going on to the next lesson. After they had done these things, they then had to determine the most appropriate media to use in a given situation. Only after these steps were completed did the designers of the system release it for general pilot training.

The training program as finally adopted was started in a regular classroom with still pictures; which was a very abstract way to present information (we will say more about this later). Then pictures of instrument panels and various audio-visual presentations utilizing audio tapes and still pictures were used. After this introduction, exhibits were used in which mock-ups of gauges, controls, etc. were shown. The learners needed to have more than just pictures with which to develop skills. The next step was building a mock-up of the whole 747 cockpit.

Then, as the next to last step, a simulator was developed like the one shown below.

Computer-controlled simulator

used to train 747 pilots



The simulator cost five and a half million dollars. Essentially, the simulator was a cut-off 747 cockpit (which included working controls and gauges) mounted on hydraulic cylinders controlled by a computer. It was so realistic that it included a visual display of the runway in front of the pilot. The visual display utilized a motion picture which was operated by the computer. The simulator was so effective that the pilot could see and feel all the sensations (even including the sound of the wind and engine noises!) of actually flying the aircraft while the cockpit was really being turned and banked, raised and lowered etc. by the hydraulic cylinders in conjunction with the computer and the pilot's hands on the controls. This was considered to be a very concrete experience. Most pilots who sat in the simulator were absolutely convinced that they were flying the airplane. As a result, the United Airlines training program for the 747 was one-third the cost of prior training programs. Furthermore, as of this writing, there has not been one fatality connected with a crash of a 747 which was due to pilot error. Why has this been the case? The designers determined what was needed and then developed the most efficient way to do it. In other words, they systematically analyzed the learning task.

The preceeding discussion of the development of the 747 training program illustrates what we mean by a learning systems approach to education or training. This is the kind of application we need to apply to the education of students. More specifically, we have to examine the objectives, consider the characteristics of the learners, determine the media and methods that can most effectively and efficiently accomplish the objectives, and then test our procedure to make sure that it does what it is supposed to do, i.e. students can perform the objectives as a result of the instruction. This kind of analysis and application is especially appropriate now as local, state, and federal government, as well as parents and even companies with educational programs for their employees are increasingly critical of education and are practically demanding that we produce, and prove it! We can become more efficient and effective or we can give up. If we give up or decide to stay with the status quo, other agencies will eventually come to the forefront to take over the educational process. No longer can an instructor expect to pick up a single textbook and present students with information from that book. Instructors are going to have to face the fact that governing agencies are going to hold teachers responsible for the learning of the students in their charge. Industry has already done this and many states are beginning to flirt with this new concept. The effective use of media is certainly an integral part of this total picture.

Now let us begin to identify the various factors that you should consider when you are selecting media. The factors are: (1) type

of objective and the level of abstraction of whatever it is we want to teach; (2) learner characteristics; (3) physical and logistical considerations; and (4) cost. Each of these will be discussed in more detail below.

Type of Objective and Level of Abstractness

Objectives are of three kinds (or domains), the psychomotor, cognitive and affective. You have, or will have studied about these three kinds of objectives in the last five SISC exercises for this course, entitled Principles and Practices of Instructional Technology. These filmstrip-audio presentations go with this module. Psychomotor objectives include such things as playing a piano, flying a plane, swimming, typing, and anything else that involves a learned physical response. Because psychomotor objectives are essentially physical, they practically cry for instruction that involves the learner in that type of activity. For example, in swimming it would be ridiculous to teach someone without allowing them to actually swim. The same is true for typing. If someone were going to learn to type, it would be ludicrous for him to do so without using a typewriter. So when you think of media to use with psychomotor objectives, you have to involve the learner with the actual situation or a mock-up of the object the learner is to learn to operate. The learner has to be physically involved.

Affective objectives are objectives having to do with feelings, attitudes, and beliefs. Affective objectives are among the most important objectives in the instructional process, but the ones we handle most poorly. The fact of the matter is we really know very little about how to change how a person feels or thinks. The reason we feel these kinds of objectives are important is because it is probably more important for those being instructed to like what you teach than it is for them to learn what you teach. In other words, if you teach something very well but you turn the students off to wanting to interact with it again, you would probably have been better off not to teach it in the first place. When students finish whatever it is you have been teaching, it is extremely important that they want to interact with that learning again in the future. For example, it is vital to us that from this course you develop a favorable attitude toward the use of media. This is even more important than if you actually know how to use them most advantageously. If you develop a favorable attitude toward media, chances are you will learn how to use various forms of media even if you should forget how or never have learned in the first place. In other words, you will have an "approach," rather than an "avoidance," attitude toward media. Because many attitudes are so difficult to change,

we won't do much in the instructional process with trying to change them. There are a few things we know about changing attitudes however. For example, we know that as you approach reality with students, the more likely you are to be able to change attitudes and feelings. It is better to show a very realistic film, a film that students can really become involved in, rather than to allow students to see a rather artificial filmstrip or listen to a tape. Similarly, simulation games are among the most effective ways to change attitudes, beliefs and feelings. Simulation games by their very nature get people involved. While they are only play-acting, students nevertheless can't help getting "into" the situation. Another way to change attitudes is by letting students interact with a personality with whom they strongly identify. (Unfortunately, it is not usually the teacher that students feel closest to). It is very inefficient to try to change attitudes by lecturing at students against or for something or letting them read about it. You have to use a "gut level" type of instruction. Yet instructors very often do not do this, because as you approach the more hands-on kinds of learning, the learning becomes more inefficient and takes longer. If, however, you really believe that attitude cultivation is important, you are going to have to get to the kinds of learning that will really get students involved.

Instructors, are more likely to be concerned with the last of the three types of objectives, those in the cognitive domain. Why? For one thing, most instructors see their role as the transmitter of knowledge or culture. For another, cognitive objectives are usually the easiest to teach. By cognitive, we mean those objectives dealing with knowledge, the thinking process, and the manipulation of facts. Therefore, textbooks, lectures, computers, anything at all that will transmit information, will work in the cognitive domain. The instructor has to make the decision when dealing with cognitive objectives as to whether he or she should use a textbook, a lecture, a film or any other type of media. How do you decide this? What criteria should you use? This brings us to another aspect of cognitive objectives and that is the level of abstraction of information you want students to learn. We have to adjust the level of abstraction of our objectives to the developmental level of the students, i.e., adjust the difficulty level of what we are trying to teach to the level at which our learners are able to learn. We don't think it comes as any surprise to you that direct experience is the most concrete of the levels that we are talking about while verbal symbols are the most abstract.

Consider your educational experiences. At kindergarten, first, and second grade levels you functioned almost exclusively at the direct experience level. At the college level, you function almost exclusively at the two highest levels, dealing with visual

and verbal symbols. And we are sure, even with your level of sophistication and intelligence, that for some of the kinds of learning you are asked to do, it is difficult for you to function at the verbal symbol level. At this point, let's review the levels of abstraction. The most concrete level would be direct purposeful experience. The next most concrete would be simulation exercises. The third level would be exhibits (such as models and cutaways). The fourth level would be motion pictures such as 16mm, 8mm, and television. The fifth level would be still pictures, such as photographs, filmstrips, and slides. The sixth level would be visual symbols such as words and graphs. The seventh and most abstract level would be spoken verbal symbols, such as lectures or tape recordings.

Even though direct purposeful experience is most effective, we can't stay at that level with all education. The reason this is so is because as you approach the visual and verbal symbols level, learning is most efficient. We can give you a great amount of information to process and because you had prior vicarious experience, you are able to fill in the "blank" spaces and learn from verbal and visual symbols. However, very young children, kindergarten and below, very seldom can learn by visual and verbal symbols. They learn best by the direct experience approach. But even so, for some of the very important kinds of learning at the college level, direct experience sometimes has no substitute. For example, we doubt very much if you would like to be operated on by a surgeon who had not had direct experience on cadavers before he tries working on you! Another case where direct or simulated experience would be highly desirable, if not critical, would be for an airline pilot. Certainly you wouldn't want to fly from Detroit to Paris, France with a pilot who had only read about flying an airplane and has not at least been in a simulator, or better yet, had direct experience in an actual airplane. Perhaps we are picking out some rather extreme examples to illustrate our point. Nevertheless, it is the belief of the designers of this course that we too often use visual and verbal symbols for our most important learning, when, because the learning is so critical, we ought to be at the simulation or direct experience level. It is up to the instructor to decide the importance of instruction and the learning level of the student in order to see where he can balance efficiency with effectiveness. Certainly we would not say we should always be at the direct experience level. If that were the case, there would be no need for schools or other educational endeavors. We should always try to work with our learners at the most efficient level where they can still learn effectively. It is up to you as a teacher (after you have had some experience) to determine the kind of media most appropriate for your students, given their level of development and the level of abstractness and importance of the material to be learned.

Besides balancing the effectiveness-efficiency (level of abstractness) aspect of objectives, there are six questions that you should ask yourself about objectives you set down for students: (1) Does the objective require a visual component? Do students have to see something in detail in order to learn it? If so, then you are going to have to use some kind of pictorial representation-a filmstrip, a slide, a transparency, a photograph, or something printed on paper or written on a blackboard. (2) Does the object require motion? For most applications in education, motion is not required. In fact, motion is often used when it doesn't need to be used. And you can understand that to add the motion component to media raises the cost tremendously--in some cases tenfold. But if it does require motion, then you have to decide on whether it requires 16mm film, super 8mm film, or television. (3) Does your objective require color? Actually, very few objectives really require color. More realistically, however, we are a color-oriented society and you can literally turn off students nowadays without having visual components in "living color". (4) Does your objective require an audio component? If audio is needed, then you will consider media such as records, audio tapes (both reel-to-reel and cassette) and perhaps cartridges. Certainly if you were instructing a foreign language, were teaching sales techniques, or teaching speech, the audio component would be very important. (5) The tactile component is the fifth question. Certainly in fabric selection, in wood working, and in metal finishing, the sense of touch would be very important. (6) The last one, not too often seen in education, would be the olfactory component, that is, the sense of smell. It is possible that your objective may require this, e.g., in a cooking class or perhaps a chemistry class.

Learner Characteristics

The second factor that you must consider in the selection of media is learner characteristics. What do we mean by "learner characteristics"? Do we mean the developmental level of learners? Do we mean age and IQ? Certainly these are important but they are also obvious, and we described them earlier when we described levels of abstraction. What we mean here is that educational researchers have come to realize that people have different learning styles. That is, we learn most effectively in different ways or by the use of different kinds of media. Oakland Community College in Michigan has set up an experimental system in which they try to assess their students' learning style with a series of tests. They then provide eleven different types of learning activities to try to match the learner with the media so that the learner can achieve the objectives most effectively. The results of their efforts can best be seen in the decrease in

Oakland's dropout rate. A few years ago the dropout rate was 55%; now it is only 10%. Here is an example of the learning systems approach applied to education where it really shows results.

What are some of the different methods used by Oakland Community College to teach basic objectives? They have three different types of lecturers. One type of lecturer is very friendly and open with students. Another type acts as more of a father figure. A third type lectures on the material, does not digress, starts exactly on the time and finishes on or before the hour is up--he or she simply gives the facts to the students. They have youth-tutor-youth instruction, i.e. students tutoring other students. They have an audio-visual approach. They utilize paraprofessionals-people who are not teachers but who may be practitioners in the field. They have small group seminars. They have programmed instruction. In essence, they try to match the student with instruction that is most appropriate for that student. It is our feeling that it is probably not absolutely vital to test students to find out their learning styles. However allowing students to select the type of instruction which they feel is most appropriate for them when they enroll in a course should help maximize the potential for learning.

What can we do to provide for different learning characteristics? We can adopt <u>student pacing</u>. We can allow the student to pace himself through the course and learn the material at a rate commensurate with his abilities or his time schedule.

<u>Entry level accommodation</u> allows for past experiences or lack thereof. This involves testing students when they first enroll in a class or workshop to determine the objectives the students already know (you might be surprised at what students already know before they come to your class). The students would then take just the instruction they need in order to learn the objectives they don't know at the beginning of the course. It is clearly a waste of students' time to teach them objectives they know already. On the other hand, it is probably a greater mistake to work with students at a level at which they can't function simply because they have not learned prerequisite objectives.

A third way to provide for different learner characteristics is with <u>alternative learning strategies</u>. Here we are talking about such programs as the Oakland Community College strategy where different kinds of media and methods are provided for students to learn the objectives.

The fourth way to handle different learner characteristics is through the <u>multiple access approach</u> which permits students to go over material enough times to learn the objectives. Obviously

a lecture is a very poor way to allow students to go over material. After the lecture is over, it is done. If the student was daydreaming, if he missed the lecture, or if the material was difficult and he became confused, he cannot go back and hear the lecture again. As far as he is concerned, the information is gone. Consequently, the types of media that allow students to replay information makes possible the multiple access approach.

If you examine the various components of this course you understand pretty much the ways in which we have tried to account for learner differences. We provide for student pacing in that you can proceed through the course at your own pace. Entry level accommodation is used as evidenced by the pre-test to all modules. If you do well on the test you probably realized that you may not need to do any further reading or do any other study on particular objectives for that module. Another way in which we allow for alternate learning characteristics is to provide you with alternate forms of instruction. You can learn the objectives from the written information that follows the objectives (what you are doing now). You can read suggested pages from other sources by consulting the bibliography that proceeds each of these modules. We don't hold you responsible for any particular kind of instruction with the exception of the simulation exercise (Module 5), because we want you to go through the process of finding media in your field. But with that exception, we do not have any other kinds of learning that we insist on. We also subscribe to the multiple-access approach as we encourage you to go through the information in the Self Instructional Systems Center or the packets as many times as you need to before you must demonstrate your proficiency in operating equipment. And, by the way, while we are discussing equipment operation, notice the Self Instructional Systems Center and the packets provide you with a very direct kind of experience. We feel that you should definitely be able to operate equipment when you leave this class, so we seldom leave it up to something as abstract as a lecture or the printed page to teach you these skills. Instead, we have you operate the real thing. We know and you know that you can operate equipment when you leave this class. Even if you forget some aspects of equipment operation after this class, you will undoubtedly approach the equipment rather than avoid it. As you begin working with the particular hardware, most of what you had forgotten will return. We practice what we preach in Secondary Education 420.

Physical and Logistical Considerations

Physical and logistical considerations are a fourth factor that must be considered when selecting media for the instructional setting. Physical and logistical considerations include the

physical setting in the instructional area and time and space factors. In terms of physical considerations, some otherwise excellent media resources may not be appropriate when they are used in a very poor environment for that particular resource. Improper acoustics, poor lighting, a noisy room and any number of factors can operate to make a medium inappropriate where otherwise it might be extremely effective. Certainly the number of students you have in your class would affect the kinds of media you would use. With a very small number of students it might be much more efficient to provide them with direct experience. After all, this is the most effective way to learn. However, when you have a very large number of students, you are going to have to use at least some of the more abstract kinds of media like large group lectures, motion pictures, still pictures and written words.

Time and space are critical because if you only have students for very short time periods in a given day, you are going to have to select media which are appropriate for that time span. In certain kinds of educational situations the instructor doesn't interact directly with students at all. In fact, the Institute for Personal and Career Development operates exactly in this manner. In this kind of situation, media have to be selected which will present information to students in the absence of an instructor.

Cost

The last consideration for media selection is cost. We can say that cost influences availability. If it is too expensive, it is simply not available to you. In many cases, a computer might be appropriate to help students achieve the stated objectives. However, in many educational settings computers are not available because of the expense involved. Therefore, to obtain many of the benefits of computer assisted instruction, one could substitute programmed instruction, not as efficient perhaps, but much less expensive. There is another aspect, however, that must be considered when cost is a concern. We have discussed cost in terms of the cost of purchase or rental of hardware and software. But consider the cost of error--the cost to the student or the student's employer when he doesn't learn. Very seldom do people think about this.

Additional Rules for Media Selection

In addition to the four selection factors discussed earlier, there are some general rules for media selection. These are "rules of thumb" you can use to select more effectively the type of presentation you need. First of all there is the KISS rule. It means "Keep it simple, sonny." Always consider the simplest way to achieve an objective. We really suffer from over-kill in the use of media.

Another is the GIGO rule, adopted from the computer people. It means "garbage in, garbage out!" No matter how effectively you embellish a form of learning, if the information wasn't worth learning in the first place, it will not help the student in the long run. If it's not good going in, it certainly is not going to be good coming out.

Yet another rule, and one we touched upon earlier, is the fact that the more concrete (approaching direct experience) the instruction, the more effective it is. However, the more abstract the instruction, the more efficient it is. So you, the instructor, will have to weigh effectiveness with efficiency and strike some kind of balance.

A fourth rule is that multisensory learning is generally better than learning involving a single sense. If you combine media to teach an objective you are likely to be more effective than if you use a single medium. For example, if students can hear and see at the same time rather than hearing or seeing alone, they have a better chance of learning. Dr. Robert M. W. Travers of Western Michigan University has been conducting research which has tended to contradict this point of view. Nevertheless, it is our belief that for most kinds of learning and for most kinds of students, the multisensory rule still applies--the more senses you can involve at once, the more effective and efficient you are going to be with the learner.

The fifth and last of the general rules for media selection we are going to discuss here is that the more alternatives to learning you can offer, the more likely the learner is to reach criterion level. Stated another way, the more alternatives which you provide for the learner to learn, the more likely he is to be able to achieve the objectives at a level which you consider adequate (criterion level).

Summary

In summary we can say that the module you have just studied, Factors to Consider in Media Selection, is simply a part of a larger consideration, i.e., the "systems approach" to developing instruction. That approach in its simplest form consists of the following steps. First you identify the problem and assess the need and establish priorities. Then you analyze the setting, the audience, the physical condition of the area which you are using, and the available resources. Next you identify objectives to determine which of them are appropriate for the students in your charge. It is at this point that you would begin to specify methods and media to accomplish the objectives identified earlier. After the selection of materials and methods, you should determine how well they work by observing how well students achieve the stated objectives. If your students have problems learning (and you consider that the objectives are appropriate), then the only other conclusion you can come to is that you have selected the wrong medium and/or method. If this is the case, revise and test again. When you begin to select media you have to look "at the big picture"--that is, what is important for children to learn. It is only in this way that media can be used effectively in the educational setting.

Area 2--Principles and Practices of Instructional Technology-Behavioral Objectives

NOTE: The number that you see on the left hand side of the paper refers to the particular Principles and Practices of Instructional Technology slide-cassette set (there are five of them) that make up Area 2. Note too the "involvement form" that immediately follows these objectives. It is strongly suggested that you use the involvement form for each set as you work thru them.

340-0292 1. The student will name the three components in the approach to instruction upon which instructional technology is based.

A.
B.
C.

2. The student will differentiate between an educational goal and a behavioral objective in terms of the relative precision with which each is stated.

3. Given a list of statements, the student will correctly label each statement as either an educational goal or a behavioral objective.

4. The student will select the statement that best describes the purpose of writing behavioral objectives.

5. The student will list three advantages of interactive instruction.

A.
B.
C.

6. The student will describe the purpose of validation and explain the validation process.

7. The student will explain why interactive instruction is relatively easy to validate.

340-0293 8. The student will select the statement that best describes the terms used in stating affective objectives.

9. Given a list of activities indicative of a desired internal state, the student will discriminate between those that would be appropriate in any instructional situation and those that might be inappropriate in some situations.

10. Given a list of statements, the student will identify each as an educational goal, a cognitive objective, or an affective objective.

340-0294 11. The student will be able to state the three main characteristics of a behavioral objective and give a brief explanation of each one.

A.

B.

C.

12. Given a list of objectives, the student will be able to identify the behavioral terms, the conditions, and the standards.

13. Given a list of objectives, the student will discriminate between those that are adequate and those that are inadequate.

340-0295 14. Given a list of ten instructional objectives, the student will underline the observable and measurable terms and will classify each objective as motor performance (MP), verbal (V), or discrimination (D).

15. Given a list of performance requirements, the student will classify each as either MP, V, D, or a combination of these.

16. The student will explain what should be done with an objective that appears to be too large and complex or to consist of many kinds of activities.

17. The student will explain the primary difference between an interim objective and subobjective.

18. Given an instructional objective, the student will select the subobjectives that are critical for completion of the terminal performance requirements.

340-0296 19. The student will list the three primary functions of the criterion test.

A.
B.
C.

20. Given a list of objectives and test items, the student will classify the behavioral requirements stated in the objectives and test items.

Involvement Form for 340-0292

1. What is the difference between educational goals and behavioral objectives? (Check your answer)

   _____A. Educational goals are stated in more general terms than behavioral objectives.

   _____B. Educational goals are more precisely defined than behavioral objectives.

   _____C. There is no difference.

2. Why do we write behavioral objectives?

   _____A. To prepare the groundwork for writing educational goals.

   _____B. To describe behavior in terms of student performance.

   _____C. To describe behavior in terms of teacher performance.

3. Label each of the following statements:

   E = educational goal B = behavioral objective

   _____A. The student will know the principles of economics.

   _____B. The student will explain the difference between kinetic energy and potential energy.

   _____C. The student will construct an isosceles triangle.

   _____D. The student will learn to use a slide rule.

   _____E. The student will recite the Gettysburg Address.

4. What are three advantages to be gained from interactive instruction?

   A._____.

   B._____.

   C._____.

5. What is the purpose of validation?_____

   _____.

Describe the validation process_____

_____

6. Is it easier or more difficult to validate interactive instruction?

_____

Why?_____

_____

_____

7. Instructional technology furnishes an approach to instruction that is based on three key components. What are they?

A._____

B._____

C._____

NOTES:

Involvement Form for 340-0293

1. A well-written instructional objective describes:

   _____A. Internal activity

   _____B. Visible performance

2. An affective goal is concerned with:

   _____A. Internal behavior

   _____B. Visible performance

3. Which of the following statements is true?

   _____A. We state an affective objective in terms of the desired internal behavior.

   _____B. Even though an affective objective is concerned with internal behavior, we state it in terms of an external and visible activity.

   _____C. Both of the above statements are true.

   _____D. Neither of the above statements are true.

4. During a one-week period of observing an "enthusiastic" student of classical music, the following activities were noted:

   _____A. Spent several hours in the library reading music books.

   _____B. Argued violently with fellow students after class about the relative merits of the latest "group" (against) and the local symphony orchestra (for).

   _____C. Was present at every class meeting. (Survey of attendance records showed that student had not missed a single class since beginning of the course.)

   _____D. Requested appointment to discuss points not covered in class.

   _____E. Attended concert by visiting symphony orchestra.

   All of the above activities can be used as "indicator performances" in statements of affective objectives. Label

each activity:

A = Appropriate for use in all instructional situations

R = Might be inappropriate in some instructional situations

5. Label these statements as follows:

E = Educational goal C = Cognitive objective

A = Affective objective

_____A. The student will understand mitosis.

_____B. The student will have a feel for the scientific method and the nature of science.

_____C. The student will construct a circle, an arc, and a central angle.

_____D. Given a list of major bills passed by Congress, the student will be able to select the three which influenced labor and management.

_____E. The student will voluntarily read about Renaissance art from books that were not assigned in class.

_____F. The student will talk to other students about the works of Shakespeare apart from test-oriented topics.

_____G. The student will complete at least one optional assignment of trigonometry problems.

_____H. The student will have empathy for those whose socio-economic background is different from his own.

Involvement Form for 340-0294

1. Which of the following terms usually refer to objectives that have to do with subject matter skills?

_____A. Behavioral
_____B. Affective
_____C. Behaviorally stated
_____D. Cognitive
_____E. Instructional

2. What are the three main characteristics of an instructional objective? Give a brief explanation of each one.

A.

B.

C.

3. Read each of the following objectives. Circle the behavioral terms. Underline the conditions. Draw a wavy line under the standards. If the conditions and/or standards are not stated, record that information in the space provided.

A. The student will be able to list five factors that influence our manpower with respect to import and export of goods.

_____

B. Given the names of five authors and the titles of ten novels, the student will match each novel with its author.

_____

C. Using a French-English dictionary, the student will translate Beaudelaire's poem "le Lecteur" with not more than three grammatical errors.

_____

D. The student will be able to write an essay describing the events leading to the stock market crash of 1929.

_____

E. Given samples of copper, nickel, and lead, the student will record the color, odor, and texture.

_____

F. Given two algebra problems similar to the example, the student will solve them within five minutes and both must be correct.

Example: $ax^2 + bx + c = 0$

G. Given an alphabetical listing of the first 25 presidents of the United States, the student will be able to name the presidents in chronological order.

H. The student will be able to use a slide rule to compute square roots.

I. The student will be able to draw a right triangle, an isosceles triangle, and an equilateral triangle.

---

4. Label these objectives.

A = Adequate NA = Not Adequate

If you think the objective is not adequately stated, briefly explain why.

_____A. The student will be able to solve, without error, 20 problems of the form:

$ax^3 + bx^2 + cx = 0$

_____B. The student will write a paragraph about the Supreme Court.

_____C. The student will type a letter in block format without error.

_____D. Without using any reference materials, the student will translate a paragraph in English into German with no errors in grammar and no more than one error in vocabulary.

_____E. Given examples of Doric, Ionian, and Corinthian orders of Greek architecture, the student will be able to see at least two features that distinguish the columns of each order.

_____

5. Objectives are always written in behavioral terms; that is, they must contain an action verb. If any of the following statements does not meet this requirement, rewrite the statement in behavioral terms.

Example: The student will ~~learn~~ write Einstein's mass-energy equation.

A. The student will be able to grasp the difference between an educational goal and an instructional objective._____

_____

_____

B. The student will be able to list the main characteristics of an instructional objective._____

_____

C. The student will know objectives that are stated in behavioral terms._____

_____

D. The student will appreciate Walt Whitman's poem "When Lilacs Last in the Dooryard Bloomed."_____

_____

E. The student will thoroughly comprehend the reason for writing objectives in behavioral terms._____

_____

F. Given a list of objectives, the student will be able to identify the behavioral terms, conditions, and standards.

_____

_____

G. The student will understand the term "affective goal".___

_____

H. The student will name the two components of an instructional objective that may be either implied or stated._____

_____

I. After completing Unit 3 of this workshop, the student will be able to sense the difference between adequate and inadequate statements of objectives._____

_____

_____

J. Given an ambiguous objective, the student will realize whether conditions, standards, or both are needed to clarify the objectives._____

_____

_____

Involvement Form for 340-0295

MOTOR PERFORMANCE	VERBAL	DISCRIMINATION
adjust	cite	choose
align	copy	classify
apply	define	compare
close	describe	contrast
construct	explain	decide
(dis)assemble	letter	detect
(dis)connect	list	differentiate
draw	name	discern
duplicate	quote	distinguish
insert	recite	divide
load	record	identify
manipulate	repeat	isolate
measure	reproduce	judge
open	(re)state	match
operate	transcribe	pick
remove	write	select
replace		
stencil		
tune		
turn off - on		
type		

NOTES:

1. Read and underline the observable and measurable terms in each objective. Mark MP for motor performance, V for verbal, and D for discrimination in the space before each objective.

_____A. The student will describe the Federal Reserve System in outline form.

_____B. Given the statistics, the student will be able to draw a bar graph showing cost of living increase in the United States (1965-1969).

_____C. The student will be able to select the tools and equipment needed for a specified chemistry experiment.

_____D. The student will identify seven kinds of bacteria by labeling an illustration of each.

_____E. The student will list two reasons why wind is a limited source of power.

_____F. The student will be able to construct a circle and a central angle.

_____G. The student will name nine labor organizations that were attempts to give the laborer better and safer working conditions.

_____H. Given a list of major bills passed by Congress, the student will be able to select the three which influenced labor and management.

_____I. The student will record all experimental findings in his class data book.

_____J. The student will properly focus the lens on a standard microscope.

NOTES:

2. Classify each of the following performance requirements as either V for verbal, D for discrimination, or MP for motor performance, or a combination of these:

_____A. Writing a report

_____B. Operate a calculator

_____C. Classify organisms observed through a microscope

_____D. Adjust the compass

_____E. Evaluating a news article

_____F. Identifying a right triangle

_____G. Repairing a microscope

_____H. Explaining repair of a microscope

_____I. Producing a blueprint

NOTES:

3. What should be done with an objective that appears to be too large, complex and to consist of many kinds of activities?

_____

_____

_____

4. What is the primary difference between an interim objective and a subobjective?_____

_____

_____

_____

5. Read the following instructional objective and select the subobjectives that are critical for completion of the terminal performance requirements.

Instructional Objective: Given a pattern, the student will fasten the pattern to the material, trace the interior design from the pattern to the material, and cut out a duplicate following the pattern outline.

Subobjectives:

_____A. The student will fasten the pattern on the material.

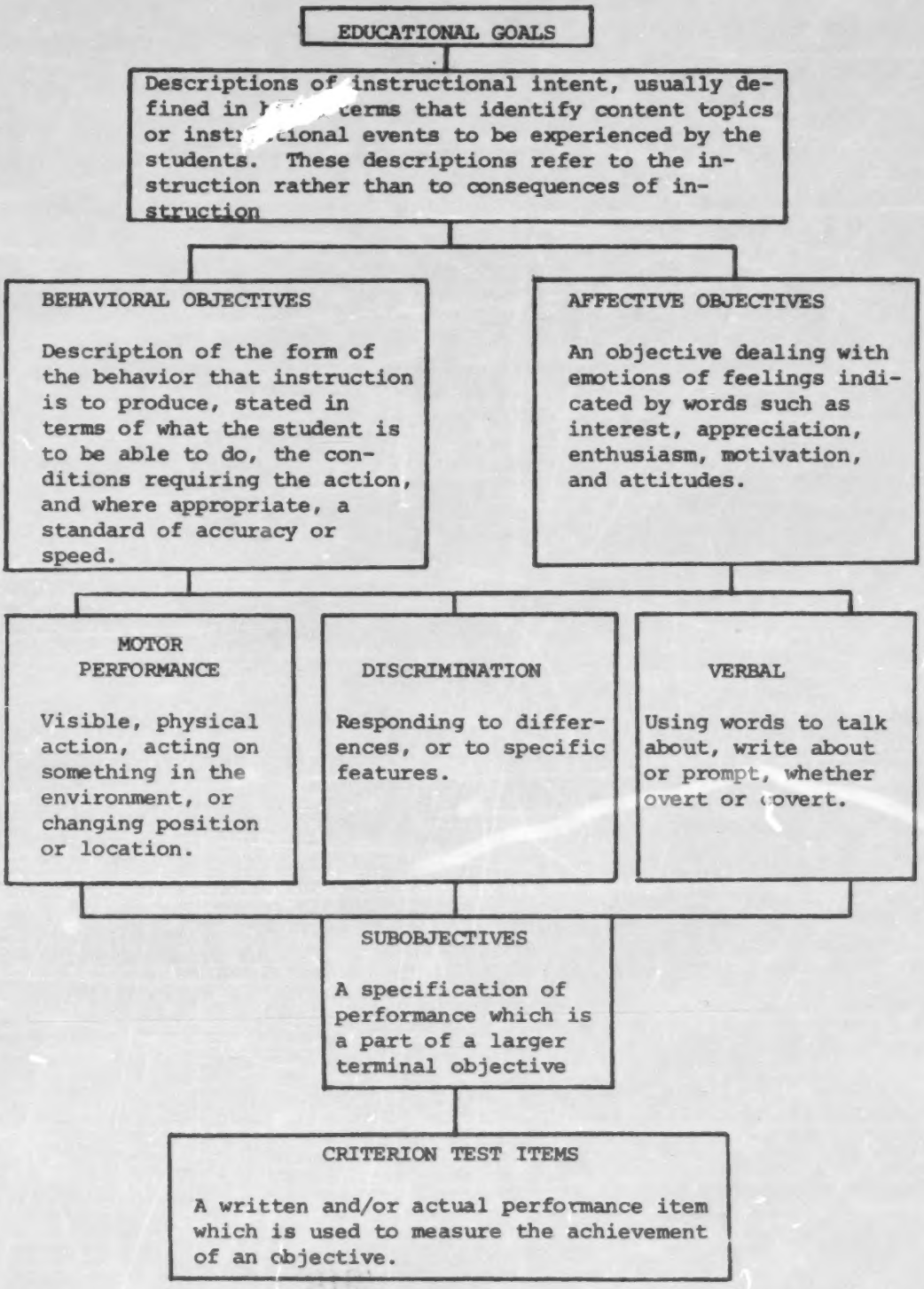
_____B. The student will select the proper tool to trace the interior design from the pattern.

_____C. The student will trace the design.

_____D. The student will describe the procedure of reproducing a copy from a pattern.

_____E. The student will select the proper tool for cutting the duplicate from the pattern.

_____F. The student will cut out the duplicate from the pattern outline.


EDUCATIONAL GOALS
Descriptions of instructional intent, usually defined in terms that identify content topics or instructional events to be experienced by the students. These descriptions refer to the instruction rather than to consequences of instruction
BEHAVIORAL OBJECTIVES
Description of the form of the behavior that instruction is to produce, stated in terms of what the student is to be able to do, the conditions requiring the action, and where appropriate, a standard of accuracy or speed.
AFFECTIVE OBJECTIVES
An objective dealing with emotions of feelings indicated by words such as interest, appreciation, enthusiasm, motivation, and attitudes.
MOTOR PERFORMANCE
Visible, physical action, acting on something in the environment, or changing position or location.
DISCRIMINATION
Responding to differences, or to specific features.
VERBAL
Using words to talk about, write about or prompt, whether overt or covert.
SUBOBJECTIVES
A specification of performance which is a part of a larger terminal objective
CRITERION TEST ITEMS
A written and/or actual performance item which is used to measure the achievement of an objective.

6. Describe briefly why we feel that objectives are so necessary and valuable for the teacher.

7. Describe briefly why we feel there is value in giving our objectives to our students.

NOTES:

Involvement Form for 340-0296

	OBJECTIVE	TEST ITEM	CLASSIFICATION OBJECTIVE	CLASSIFICATION TEST ITEM
_____A.	Fill in form	Fill in form	V	V
_____B.	Operate calculator	Operate this calculator	MP	MP
_____C.	Adjust microscope	Name adjustment parts of a microscope	D	V
_____D.	Write the equation for Ohm's Law	Write the equation for Ohm's Law	V	V
_____E.	Solder connections	Indicate which connections are acceptable	MP	D
_____F.	Explain use of micrometer	How is the micrometer used?	_____	_____
_____G.	Use the compass	Which way is north?	_____	_____
_____H.	Select the definition for "Interaction"	Which of the following is the definition of interaction?	_____	_____
_____I.	Explain function of a prism	List, in order, the colors of the spectrum	_____	_____
_____J.	Describe a micrometer	Measure this	_____	_____
_____K.	Define "laser"	Explain how a ruby laser works	_____	_____

1. What would be the advantage in writing criterion test items before developing objectives?_____

2. List the three primary functions of the criterion test.

   A. _____

   B. _____

   C. _____

_____

NOTES:

3. Read the following brief statements of objectives and test items and decide whether the corresponding test items are appropriate or inappropriate. If they are inappropriate, explain why. Classify each objective and test item as verbal (V), discrimination (D), or motor performance (MP).

OBJECTIVES	CLASS	TEST ITEM	CLASS
A. Cite orally the five largest cities in the world	_____	Name the five largest cities in the world _____	_____
B. Trace the flow of blood through the heart on a diagram	_____	Describe the structure of the heart _____	_____
C. Select the equipment needed for a given chemistry experiment	_____	Select the proper equipment for this chemistry experiment _____	_____
D. Locate a malfunctioning tube in a radio	_____	What meter is used to test radio tubes? _____	_____
E. Define "objective"	_____	Define "objective" _____	_____
F. Deliver a five minute extemporaneous speech	_____	Describe how to organize for an extemporaneous speech _____	_____

2. A new course, based on objectives and a criterion test, has undergone a series of tests and revisions. All students scored about 95% on the criterion test, but only 31% can perform the task. What's wrong?_____
_____
_____
_____

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4. Instructional Goal

The student will know how to punctuate sentences, following conventions and rules regarding acceptable use of the period, comma, colon, semicolon, question mark, exclamation point, quotation marks, apostrophe, etc., both from the point of view of mechanical usage and to clarify and emphasize intent of each sentence.

Write four objectives for the goal described above.

(D) A. _____

(D) B. _____

(V) C. _____

(V) D. _____

Write four test items for the above question.

(D) A. _____

(D) B. _____

(V) C. _____

(V) D. _____

Examples of objectives and test items

OBJECTIVES

(D) A. Given four sentences, the student will correctly punctuate them using the colon, semicolon, and the quotation mark.

(D) B. Given four sentences, the student will punctuate those that should be punctuated with a colon and those that should be punctuated with a semicolon. This should be done without error.

(V) C. The student will be able to write a paragraph correctly illustrating at least five uses of the comma.

(V) D. The student will be able to write the rule for use of the exclamation point.

CRITERION TEST ITEMS

(D) A. Punctuate these four sentences using the colon, semicolon, and the quotation mark as required.

(D) B. Punctuate these four sentences using the colon and semicolon as required.

(V) C. Write a brief paragraph illustrating at least five uses of the comma.

(V) D. Write the rule for use of the exclamation point.

Area 3--Exercise on Selecting the Appropriate Media--Behavioral Objective

Points	Form
10	-Typewritten (double-spaced) in outline form, and in the proper order, i.e.: subject, teaching logistics, unit within subject, and cognitive behavioral objectives (with proposed evaluation procedure and proposed use of media to accomplish the objectives following each objective).
5	-Incorrect form (out of order) or too wordy
0	-Very difficult to follow
	Grammar
10	-None or very few errors in spelling, punctuation, and sentence structure
5	-More than a few errors in grammar
0	-Many grammatical errors
	Teaching Logistics
10	-Described very completely, i.e. age and type of students, teaching setting, time constraints, money constraints
5	-Description of logistics is incomplete in one of the areas above
0	-Description is incomplete in two or more of the above areas
	Quality of Cognitive Behavioral Objectives
20	-Objectives stated behaviorally (terms, conditions, and standards) and subobjectives present when needed.
10	-Some objectives not stated behaviorally or needed objectives or subobjectives missing
5	-Objectives poorly stated
0	-Objectives very sparce--not nearly enough to complete unit of instruction
	Evaluation
10	-Description of proposed evaluation matches behavior called for in each objective
5	-Some of the evaluation does not match behavioral objectives
0	-Evaluation procedure poor or missing

Points	Learning Activities (use of media)
40	-Proposed use of media will accomplish the objectives, is individualized (if appropriate), and matches the logistics of the teaching situations.
30	-For some objectives the media is not appropriate
15	-For over half the objectives the media is not appropriate.
0	-Very poor learning activities
100	Number of points possible in the assignment

Area 3--Exercise on Selecting the Appropriate Media--Monograph

The purpose of this exercise is to serve as a culminating activity for you to demonstrate your ability to design behavioral objectives and then select the appropriate media for students to accomplish them. Therefore, you will not only need to know how to write behavioral objectives (which you should have learned in this module) but you also will need to review the previous modules to be sure that the media you select to do the instructing is appropriate given your hypothetical teaching situation. Remember that this exercise comprises fully a third of your grade in this class. Also, the purpose is not to see how much you can write, but rather to see how well you can accomplish the objectives as listed on the prior page.

Basically, what you are being asked to do is to select a subject, hypothesize the teaching logistics, determine a unit in that subject (something that would take a couple of days to a week or so to accomplish), write good behavioral objectives for the goals of that unit, select evaluation techniques, and select learning activities which would accomplish the objectives you stated given the teaching logistics. Lets take these one-by-one:

Subject. This is merely the course for which you are responsible, e.g.- jr. high English, U.S. History, art, 5th grade geography, cooking, practical nursing, sales technique, first aid, etc.

Teaching Logistics. These include the type of student you are working with (age, motivation, maturity level, etc.), the setting for learning (classroom facilities, availability of library or learning center facilities, availability of media hardware and software, time and distance constraints, etc.), and the monetary resources available.

Unit-Within-Subject Area. Obviously, within the scope of this course it would be unreasonable to ask you to design objectives and instructional methodology for a whole course. Therefore, you are asked to select a discreet unit (or section or module) from the subject and develop it as the behavioral objectives for Area 3 indicate. A unit might be something like the use of bandages for a first aid course, punctuation for an English course, effects of immigration for a U.S. History course, presentation techniques for a sales course, etc.

Behavioral Objectives. The five filmstrip/audio-tapes in this module certainly prepared you to write behavioral objectives. What is being asked here is that you use this

knowledge to write good behavioral objectives for your unit. By "good" it is meant that the objectives indicate terms, conditions, and standards; that the objectives do not concern just trivia; and that at least some of the objectives are above the simple recall or knowledge level, e.g. that they are at the application level where knowledge has to be used to do something. For your unit you would probably have from 5 to 10 behavioral objectives or perhaps just a couple but they would include sub-objectives.

Evaluation. Your not being asked to actually design the evaluation for each objective but simply to indicate the form of evaluation you would use, e.g. paper-pencil tests, have your students operate something, assemble something, design something (just like you are being asked to design behavioral objectives for this module), write something, etc.

Learning Activities (use of media). You can see by the number of points (40 out of a possible 100) allocated to this part of the assignment that this area is considered the most important. And why shouldn't it be--after all, this is a course in media and its use. You should very carefully consider the relative importance of your objectives, then type of behavior called for, and the various considerations in the area of teaching logistics and then use your prior learning to select the type of media you would use. Remember, don't make it more complicated or esoteric than it absolutely needs to be (recall the KISS rule?) but try to select that media which would individualize instruction as much as possible (if that is your intent).

NOTE: The points that are listed to the left of the behavioral objectives for Area 3 are for grading purposes and for you to see the relative importance of each of the components that make up the exercise. If you added the maximum score for each component you would note that it would total 100. Please be aware that the length of this exercise is of no concern--our concern is that you do each of the components. It would be unusual if your exercise was over five pages long.

Post-Test

Directions: Circle the letter of the correct answer below.

1. Which of the following is a major media determination factor?

   A. direct experience
   B. level of abstraction
   C. verbal symbols
   D. none of the above

2. Which of the following is the name of a major domain of educational objectives?

   A. analysis
   B. synthesis
   C. intuition
   D. psychomotor

3. Questions regarding audio, color, small and tactile manipulation should be asked to determine media selection.

   A. True
   B. False

4. Select the most accurate statement below:

   A. Instruction provided by an audio tape recorder is inherently more abstract than that provided by a slide projector.
   B. Instruction provided by a phonograph and that provided by a motion picture projector, are about the same level of abstraction.
   C. Simulation is one of the most abstract forms of instruction.
   D. All of the above are true.

5. Student pacing and the alternative strategy approach are ways to compensate for:

   A. cost factors
   B. cognitive level
   C. individual learner differences
   D. none of the above

6. Physical constraints have no effect in media selection.

   A. True
   B. False

7. The purchase cost of hardware and software is one consideration. What is another one:

   A. cost of the physical plant
   B. cost of the teacher's salary
   C. ability to achieve objective
   D. all of the above

8. Three components upon which instructional technology is based are:

   A. analysis, synthesis, and evaluation
   B. pre-testing, post-testing, and final testing
   C. validation, objectives, and interactive instruction
   D. objectives in three domains: cognitive, affective, and psychomotor

9. A behavioral objective is best defined as

   A. a statement which tells what a learner must do as a result of instruction
   B. a statement which tells how a teacher should teach a particular subject matter skill
   C. a statement of the learning activities
   D. a description of the learning environment

10. The following statement--the learner will understand the scientific method.--is a(n)

   A. behavioral objective statement
   B. educational goal statement

11. Behavioral objectives are designed to

   A. encourage interactive instruction
   B. define learning in terms of specific student behaviors
   C. make teachers more aware of what they are doing
   D. eliminate the old criterion performance standards

12. One of the primary advantages of "interactive instruction" is that

   A. the student is kept actively participating in his own learning
   B. it takes less time to prepare
   C. the student is not so prone to "drift"
   D. it keeps the student busy

13. A process of testing and revising instruction to improve its effectiveness is called

A. pre-testing
B. validation
C. accountability
D. programmed instruction

14. Interactive instruction is relatively easy to validate because

A. it is based upon "cognitive" objectives
B. behavioral tests are "built-in" which show what a student is learning
C. it forces the learner to behave in certain ways
D. a student will tell you what is wrong and how to revise the lesson

15. The crucial terms in a behavioral objective specifies

A. observable behaviors
B. conditions of a goal
C. class of behavior (i.e. cognitive-affective)
D. standards for observing

16. Two classes of behavioral objectives are

A. "approach" and "avoidance"
B. "covert" and "overt"
C. "cognitive" and "affective"
D. "behavioral statements" and "goal statements"

17. The following objective--the learner will purchase and listen to hard rock recordings--would be classified as

A. an affective objective
B. a cognitive objective

18. Which of the following statements best explains performance <u>standards</u>?

A. standards are grading systems like "Pass/Fail"
B. standards are minimum levels of acceptable performance
C. standards are scales of achievement (like 80%, 90%, etc.)
D. standards are both the highest and lowest scores possible

19. Which of the following objectives has the standards underlined?

A. The student will <u>list</u> all Halogens.
B. Given any short dialog, the learner will <u>read</u> it with an Irish accent.

C. The student will identify 3 of any 5 mineral compounds.
D. Given a clock without numerals, the student will tell the indicated time.

20. Which of the following statements is inadequate as a behavioral objective statement.

A. Given proper tools, the student will rivet together two pieces of sheet metal so they won't come apart under hard pressure.
B. Given needle, thread, button, and cloth the student will sew on a button within two minutes.
C. Given a schematic circuit diagram, the student will list all components and the resistance-capacitance values.
D. Given a list of reasons why democracy has succeeded in America, the student will understand the democratic process.

21. What is the classification of this objective:

The student will identify resistors by their color code.

A. motor
B. verbal
C. discrimination
D. motor-verbal
E. verbal-discrimination

22. What is the classification of this objective:

Given a screwdriver and tachometer, the student will adjust the carburetor idle adjustment to factory specs.

A. motor
B. verbal
C. discrimination
D. discrimination-verbal
E. discrimination-motor

23. An objective which seems to consist of a number of lesser activities or behaviors

A. should be written as an outline
B. should be written in simpler language
C. should be written as a number of "interim" objectives
D. should be left as a goal statement

24. An objective which is a step or component of a larger objective is called

A. a goal statement
B. a cognitive objective
C. an integrated statement
D. an interim objective

25. Which of the following sub-objectives might be critical for completion of this terminal objective:

The student will correctly name all the vowels.

A. the student will name the consonants
B. the student will repeat letters of the alphabet
C. the student will identify A as a vowel

26. Which of the following is a primary function of criterion tests?

A. The criterion test permits assigning students to learning groups.
B. The criterion helps in selecting media.
C. The criterion test aids writing other tests.
D. The criterion test helps evaluate instruction.

27. What class of behavior does this test item require?

The student will balance on one foot for 4 minutes.

A. motor
B. verbal
C. discrimination

28. Which media selection should you make below--assume that all will accomplish your objectives equally well?

A. instruction that is quite abstract
B. instruction that is very concrete
C. instruction that relies on interaction with other people
D. instruction that utilizes multisensory stimuli

29. Your students in a science class are having trouble learning the principle that friction generates heat. You consider this a very important objective and you want to make sure all your students know this. What medium below will be most effective for you to use in seeing that students learn this? Time is no particular consideration but money is and also you want

to individualize learning as much as possible.

A. programmed instruction
B. lectures
C. 16mm film (silent)
D. slides with an audio tape

30. Students in your industrial arts class need to learn how to run a power saw (which you are soon going to replace with a newer model). You have little money but you do have access to a 35mm camera and film, video-tape equipment, and an off-set press. What should you use if you were going to make your own materials to instruct your students?

A. Super 8mm film
B. video tape
C. slides
D. filmstrips

31. You are teaching an adult health education class in a rather remote rural area in which there are many poor readers. You want your students to have as much interaction as possible with public officials. Which medium below would be very high in your priority list?

A. amplified telephone
B. lectures featuring public officials
C. super 8mm film
D. television

32. You are teaching an advanced high motivated class in sales technique. You want to select instruction that will allow the learners to proceed at their own pace and yet be in-expensive. Which medium below would you select?

A. a lecture featuring a well-known writer
B. slides or filmstrips with audio-tape
C. printed materials
D. audio-tapes

Post-Test Key

Question Number	Correct Response	Module Number	Area Number	Behavioral Objective#
1	B	8	1	1
2	D	8	1	2
3	A	8	1	3
4	A	8	1	4
5	C	8	1	5
6	B	8	1	6
7	C	8	1	7
8	C	8	2	1
9	A	8	2	2
10	B	8	2	3
11	B	8	2	4
12	A	8	2	5
13	B	8	2	6
14	B	8	2	7
15	A	8	2	8
16	C	8	2	9
17	A	8	2	10
18	B	8	2	11
19	C	8	2	12
20	D	8	2	13
21	C	8	2	14
22	E	8	2	15
23	C	8	2	16
24	D	8	2	17
25	C	8	2	18
26	D	8	2	19
27	A	8	2	20
28	A	8	1	8
29	D	8	1	9
30	B	8	1	9
31	A	8	1	9
32	C	8	1	9

To consider yourself competent in this module (for Areas 1 and 2), you should not have made more than 3 errors.

GLOSSARY

The following list of terms is not meant to be comprehensive but to provide students with a ready reference to terms and concepts used in Educational Media that may be unfamiliar to the student.

AMPLIFIER. With reference to the sound motion picture projector, the amplifier controls the reproduction of the sound recorded on the film. It has controls for both volume and tone.

BANDWIDTH. The range of frequencies, expressed as Hertz (cycles per second), recorded, transmitted, or reproduced by an electronic device. This concept is generally expressed as fidelity in audio systems. In Educational Media, this concept is useful in comparing the quality of various tape recorders, phonographs, etc. Also useful in comparing audio tape recorders with a maximum bandwidth requirement of 20,000 hertz with a video tape recorder requiring 3,000,000 hertz for a black and white picture and 6,000,000 hertz for a color picture.

BEADED SCREEN. A projection screen which surface consists of unnumerable minute glass beads. At a small angle it gives a high quality of reflection.

CAI (computer-assisted instruction). Sometimes more accurately named computer-based instruction. Provision of a program in a computer which can be acted upon and responded to by a student at a "terminal" which permits his "imputs" to be interpreted by the computer in accordance with the program. The computer may present to the operator written data (by typewriter) or graphic displays on a screen, or may activate other information presentation devices either to inform the student of the results of his input or to provide instructional stimuli for his subsequent interpretation and action.

CARREL. A desk with bookshelves used for individual study.

CARTRIDGE TELEVISION. Pre-recorded television program loaded into a cartridge, cassette, etc., to be loaded into the video player without manually threading or otherwise manipulating the recorded medium.

CARTIVISION. A cartridge television system developed by AVCO and American Cartridge Television Company. The recording medium is 1/2" magnetic video tape.

CATV. Abbreviation for Community Antenna Television.

CCTV. Abbreviation for closed Circuit Television.

CLOSED-CIRCUIT TELEVISION. A television system which limits distribution of an image to those receivers which are directly connected to the program initiation point by coaxial cable, microwave link, or other means that prohibits public reception of programs on standard receivers.

COAXIAL CABLE. Designed to carry many radio, telephone and television signals simultaneously.

COMPOSITION. The arrangement of objects in a picture to create balance, harmony, and center of interest.

CONDENSER LENS. A lens used in enlargers and projection lanterns to direct rays of light evenly through negatives or positives to produce an undistorted projection.

DIRECT XPERIENCE. A term generally used to mean a learning process based upon actual experience with real things in a real (true-to-life) situation. Learning to sell by working in a store is one example.

DISCRIMINATION. Generally used in this course to mean capacity to select appropriate materials or experience for learning. Discrimination is an ability necessary for successful evaluation of experiences or materials for learning.

DOCUMENTARY FILM. A motion picture film in which the scenes included serve as evidence of the line of thought or ideas the film attempts to portray.

EFLA. Educational Film Library Association.

EIA. Abbreviation for Electronics Industries Association.

EIA-J. Electronic Industries Association of Japan.

ETV. Abbreviation for Educational Television.

E.V.R. Electronic Video Recording developed by CBS and manufactured by Motorola in this country. A type of cartridge television using movie film as the recorded medium.

EXCITER LAMP. An electric lamp used in a motion-picture projector to produce a beam of light which passes through the optical sound track (a picture of sound) and subsequently falls on a photoelectric cell. The cell converts the light to a minute electric current which, in turn, is amplified and converted to audible sound waves by a loudspeaker.

EXHIBIT. A display of materials (flat or three-dimensional) or real things designed to communicate ideas, information, and feelings.

FCC. Abbreviation for Federal Communication Commission.

FILM CEMENT. Cement used in splicing film.

FILM SPLICER. An instrument designed for use in splicing motion picture film. Splicing film necessitates the use of a splicer.

FILMSTRIP, SILENT. A 35mm film containing a sequence of still pictures, usually carrying printed captions which, together with the pictures, convey the ideas to be communicated.

FILMSTRIP, SOUND. A filmstrip that is normally to be accompanied by a phonograph or tape recording carrying the audio material essential for complete understanding or enjoyment of the visual presentation.

FLIP CHART. An easel-supported series of large pages or sheets of paper that may be folded over the top of the easel as each page is exposed.

FOCAL LENGTH (in photography). A design characteristic of a photographic lens. Describes the lens in terms of the distance from the optical center of the lens to the point at which the image is in focus behind the lens. This point is generally the plane of the film, when the lens is focused at infinity.

FOCUS. The point at which a lens converges rays of light from an object forming an image.

FRAME, DOUBLE. A conventional description of a film area containing a picture equal to two standard picture areas on a 35mm motion-picture film or filmstrip. (Example: 1 x 1 1/2 inches on 35mm filmstrips.)

FRAMER. A button, lever, or knob that controls centering of a frame of film in the aperture of a motion picture or filmstrip projector.

GATE, FILM. A mechanism covering the film channel of a motion-picture projector. The gate may be opened to insert or remove the film or to clean the film channel, guides, pressure plate, and aperture.

HELICAL SCAN. The recording format developed by the Sony Corporation to provide the necessary bandwidth for video tape recording at a modest cost.

INFRARED. Rays of light below visible red.

INSTAVISION. A cartridge television system developed by the Ampex Corporation in this country and the Toshiba Corporation in Japan. One-half inch magnetic tape is the recording medium.

ITV. Abbreviation for Instructional Television. However, sometimes used to abbreviate Industrial Television.

KINESCOPE. Literally, a television picture tube. "Kinescope" is often used as a brief term for "kinescope recording," meaning a motion-picture film taken of images on a television picture tube or transferred to motion-picture film from video tape.

LANGUAGE LABORATORY. A term used to describe a room equipped for language instruction in which tape recorders, projectors, record players, and other devices are used singlely or in combination.

LARGE GROUP INSTRUCTION. An instructional group of many members. Generally more than 15.

MATTE. A type of surface for projection screen which is free from glare.

MICROFICHE. A basic element in a micro system to provide information availability, i.e., a sheet of microfilm suitable for filing, containing a number of separate images. Images can be transferred to several microforms (hard print or microfilm) for reference utilization.

MICROFILM. Film upon which, by photographic processes, printed and other materials are reproduced. The minute images on the film are observed through a special magnifying viewer or by projection.

MOTION PICTURE. A film on which has been photographed a series of pictures in rapid succession. When projected in succession they give the illusion of motion.

MULTI-MEDIA. Methodology based on the principle that a variety of audio-visual media and experiences correlated with additional instructional materials reinforce the value of each other. Some of the materials may be used to motivate interest; others, to communicate basic facts; still others, to clear up misconceptions and deepen understanding. This methodology is the same as the cross-media approach.

NICEM. National Information Center for Educational Media.

OPAQUE PROJECTOR. An instrument for projecting opaque materials--usually flat, printed manuscripts or pictures.

PHOTO-ELECTRIC CELL. The part of the motion picture projector which transforms intermittent light waves from the sound track into a variable electrical current which produces the sound upon reaching the speaker.

PREVIEW ROOMS. Rooms used for viewing projected materials.

PRODUCTION (of materials). Activities related to creation of instructional materials; graphics, photography, copying, etc.

PROGRAM. A sequence of carefully constructed items leading the student to mastery of a subject with minimal error.

PROGRAMMED INSTRUCTION (sometimes spelled programed). An instructional format that utilizes material presented in the form of a program (as described above). This format can be in printed form, in multi-media or presented by a computer. It is also individualized and self-paced.

PROGRAMMER. Individual who prepares step-by-step operations that are to be performed by a computer to solve a problem. Also one who writes programs for self-instructional books or devices.

PROJECTION LAMP. The lamp which provides the light for the projection of a picture.

PROJECTION LENS. The lens in a projector which brings the image to a focus on the screen.

PROJECTOR. A machine or instrument which permits a picture or other material to be represented on a screen greatly enlarged.

RANDOM ACCESS. Accessible without regard to sequence; retrievable in any order.

REALIA. A term often used to represent any real materials employed in instruction, such as rocks, flora, and artifacts.

RECORDING HEAD. The mechanism in a recorder which places magnetic fields on the magnetic recording tape.

REEL. A spool of developed motion picture film. Educational films are standardized at 400 feet in length.

RELIEF MAP. A map representing depressions and elevations.

RESOURCES. Immediate and possible sources of instructional elements, i.e., materials, devices, aids, personnel, funds, etc.

SCREEN, PROJECTION. A surface upon which images are projected from various optical devices. Some screens have a surface of small glass beads with a high degree of reflectivity; other have a matte white surface with less reflectivity but more even dispersal of light; some have an aluminum or lenticular surface.

SELECTA VISION. A cartridge television system developed by RCA. The television program material is recorded on a thin vinyl plastic with a laser beam.

SELF-INSTRUCTION DEVICE. A mechanical, electrical, electronic, or paper device that presents planned sequential materials to be studied by a student at his own rate and without a live instructor's assistance.

SHUTTLE. Part of the motion picture projector which brings each picture before the aperture in succession.

SIXTEEN MM FILM. Motion picture film which is 16mm in width.

SLIDE CARRIER. The part of a slide projector which holds the slide as it is being projected.

SLOW MOTION PHOTOGRAPHY. Taking pictures with a movie camera at a more rapid rate than they will be projected. When projected at the normal rate, they portray slow motion.

SMALL GROUP INSTRUCTION. An instructional group of few members. Generally less than 10 to 15.

SOLID STATE (electronics). Any electronic components, such as transistors, which have no lighted or heated filaments and which are replacing vacuum tubes in many electronic devices. Economies in space, heat, and maintenance are derived from using solid-state components.

SOUND DRUM. The portion of the mechanisms of a sound motion picture projector around which the film passes at the point where the sound is picked up. The sound drum is usually attached to a flywheel to stabilize the movement of the film through the projector at this point.

SOUND TRACK (magnetic). A sound track on a motion picture film similar to the method used in a tape recorder. A strip of iron oxide is adhered along the edge of the film, and on this strip sound is recorded and reproduced by a magnetic process.

SOUND TRACT (optical). A track for the reproduction of sound through optical means; a picture along the edge of the film of the vibrations to be reproduced.

SPEAKERS. The part of the sound motion picture projector which reproduces the sound. It should be placed at the front of the room near the screen.

SPEED, SILENT. Normal running speed for film: 16 frames per second in a 16mm motion picture projector. At silent speed, a 400-foot reel of 16mm motion picture film runs at a speed of 24 frames per second.

SPEED, SOUND. Normal running speed of 16mm sound film: 24 frames per second. A 400-foot reel of 16mm sound film runs approximately 11 minutes. 8mm and super 8mm sound film run at a speed of 24 frames per second.

SPLICE. Joining two pieces of motion picture film or recording tape. Film splicing is accomplished by welding the film ends together in a special machine and with special cement, to ensure accurate joining. A special splicing tape is used to join pieces of recording tape.

SPLICER. A device to align and hold film or tape during the process of splicing.

SPROCKET HOLES. Holes along the edge of film that engage teeth in sprocket wheels turn to advance film through the projector.

STEREOPHONIC. In effect, "three-dimensional" sound. Sound from a reproducer designed to give the illusion of hearing a live performance.

STILL PICTURE. A photograph or projected picture which portrays one scene.

SYNCHRONIZED. In motion picture projection, refers to the proper relationship between the sound and the picture on the screen. If lip movement and speech do not occur together, the picture and sound are "out of sync."

SYSTEMS APPROACH. In education, an integrated, programmed complex of instructional media and machinery whose components are structured by the teaching staff into a single unit with a schedule of time and sequential phasing. The purpose of a system design is to ensure orderly relationships and interaction of human, technical, and environmental resources to fulfill the goals which have been established for instruction.

TAKE-UP. The reel on the motion picture projector on which the film is wound as it comes from the projector.

TEACHING MACHINE. A device for presenting a program.

TECHNOLOGY. Applied scientific information. A systematic body of facts and principles related to comprehensive, practical, and useful ends.

TELDEC. A cartridge television system resembling a phonograph record and developed by the Telefunken-Decca Corporation in Germany.

THREADING. Placing the film into the projector in proper position for running.

TIME-LAPSE PHOTOGRAPHY. A process of activity photographed at stated intervals by motion picture camera, when projected, be seen in a greatly reduced time. For instance, the life history of a plant may be seen in a few minutes.

TONE CONTROL. A control on the sound motion picture projector which governs the quality of the sound.

TRANSPARENCY. A film or glass slide on which has been printed a positive image. It may be projected by transmitted light.

VIDEO CASSETTE. A cartridge television system developed by the Sony Corporation in cooperation with other Japanese manufacturers. The recording medium is magnetic video tape 3/4" wide.

VOLUME CONTROL. A control on the sound motion picture projector which regulates the intensity of the sound.

VTR(Video Tape Recorder). A device capable of recording both the audio and video signals of a television production on a special magnetic tape, which can be played back to reproduce the entire program.